40110G

SITE ASSESSMENT REPORT
VOLUME I OF VI

FMC CORPORATION
Former East Tenth Street Site
Marcus Hook, Pennsylvania

November 13, 1992

Prepared for:

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PREFACE

This report is comprised of six volumes. Volume I includes the text, tables, figure, and plates. Volume II contains all appendices to the site assessment report, excluding the external data validation report. The data validation report is included as Volumes III through VI.

The raw analytical laboratory reports comprise 48 volumes, many of which are further subdivided. These raw analytical data are not included in this site assessment report. A key which lists the contents of each analytical report is included as Volume II, Appendix D of this site assessment report. This key may be used to locate the raw data for any sample analyzed during this site assessment report.

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EXECUTIVE SUMMARY

ORIGINAL (Red)

FMC Corporation (FMC) entered into an Administrative Order by Consent (AOC) with the United States Environmental Protection Agency (USEPA) on March 13, 1991 to perform a site assessment on a portion of the East 10th Street Site (site). The AOC directed FMC to evaluate the sources and extent of compounds of concern in soils, sediment, surface water, and ground water for certain portions of the site. In addition, the AOC required an evaluation of process history, potential migration pathways and potential receptors. The areas to be investigated by FMC under the AOC include Lots 8 through 14, 15, 17, 20, 21 and 22. These lots represent approximately 14 acres of the 35 acre site. The components of the Workplan to implement the AOC were negotiated and clarified between March 1991 and January 1992.

The site assessment was conducted by Roux Associates, Inc. on behalf of FMC during the period January through September 1992. The general findings of the site assessment are as follow:

- Historical manufacturing operations were similar from the early 1900s until FMC shut down operations in 1975. The identity and storage locations of raw materials, products, wastes, and support operations were well defined during active manufacturing operations.

- As a result of improper demolition conducted by others, land disposal of construction debris, asbestos materials and PCB transformer oils has occurred. These activities may have been localized at first, but poor documentation and subsequent development activities appear to have complicated matters by scattering of materials during grading of the site.

- The site assessment activities conducted for FMC characterized the soil conditions for the areas investigated. The analytical results from 148 soil samples and the visual observations from test pit excavations confirm the absence of gross or widespread contamination in surface and subsurface soils.

- Localized, "hot spot" surface and subsurface soil impact was observed in several areas, including total petroleum hydrocarbon (TPH) concentrations observed in the vicinity of the fuel oil tank on Lot 9, surface PCB concentrations observed on Lots 13, 14, 15, and 17,

and asbestos findings on Lot 9. Low level PCB and asbestos levels were detected in surface and subsurface soil throughout the area of investigation.

- The shallow subsurface soils and fill material consist of silty clay or clayey silt which overlie weathered schist bedrock. The vertical migration through this unconsolidated material is expected to be limited. Ground water beneath the site flows to the east, with discharge to Marcus Hook Creek.

- The ground-water conditions beneath the site were examined by analyzing samples from ten (10) on-site monitoring wells. The analytical results and observations during well installation and sampling indicate historical operations have not adversely impacted the quality of ground water underlying the site. Localized PCB impact to ground water was observed in the area immediately downgradient of Lot 15.

- The primary potential migration pathways within the areas investigated include air, surface runoff by way of storm drains or sheet flow, and ground-water flow. Of these avenues, the analytical findings suggest runoff of surface materials or direct discharge to the storm drains represent the most important migration pathway for constituents on site.

- The primary potential receptors of concern in the vicinity of the site include air, ground water, and surface water. The ground water and surface water are not used for potable or recreational purposes in the immediate vicinity of the site.

1.0 INTRODUCTION

The East 10th Street Site (site) was used for the production of rayon and cellophane by the viscose process. In November 1990, the United States Environmental Protection Agency (USEPA), Region III, conducted an emergency assessment of the site which resulted in several Administrative Orders (AOs)[1] and Administrative Orders by Consent (AOC)[2] being executed between the USEPA and various potentially responsible parties (PRPs). FMC Corporation (FMC) executed an AOC on March 13, 1991 to perform a site assessment on certain portions of the site. This site assessment was performed to evaluate the following: potential sources and extent of compounds related to FMC operating in soils, sediment, surface water and ground water; potential pathways for migration of these compounds; and potential receptors in the vicinity of the site.

Previous site investigations were performed on various portions of the East 10th Street site by NTH consultants dated May 15, 1990, and Roy F. Weston, dated October 1990. Using information from these investigations, and in compliance with the AOC, Roux Associates, Inc. developed a "Workplan for Investigation of Soil and Ground-water," dated July 9, 1991 (Workplan)[3], an "Addendum to the Workplan for Investigation of Soil and Ground-water" (Addendum I), dated September 20, 1991[4], and subsequently an "Addendum II to the Workplan for Investigation of Soil and Ground-water" (Addendum II)[5], dated January 8, 1992. The content, design, and level of effort included in the final Workplan incorporated significant input from the USEPA and their subcontractor, Dynamac Corporation. The Workplan described potential data gaps from the previous site investigations and identified potential source areas which warranted further investigation based on past site operating practices. The scope of work was focused on the following 13 areas as directed in the AOC: Lots 8-14, Lots 15, 17, 20, 21, 22, and the Marcus Hook Creek. A site location map and a site plan which shows the property boundaries, lot subdivisions, and highlighting the areas of investigation directed in the AOC are included as Figures 1 and 2, respectively.

The scope of work for this site assessment is summarized as follows:

- Collection and analysis of approximately 50 biased samples of soil and fill material from visibly impacted areas, suspect areas identified by the USEPA, and areas where historical raw or waste material handling was conducted;

- Collection and analysis of approximately 100 non-biased grid samples of soil and fill material from undeveloped portions of the areas of investigation;

- Installation of six additional monitoring wells which supplemented four previously existing wells to allow determination of on-site ground-water flow direction, and collection and analysis of ground-water samples from a total of 10 on-site monitoring wells;

- Collection and analysis of surface-water and sediment samples from upstream, mid-stream, and downstream locations in Marcus Hook Creek;

- Collection and analysis of aqueous and sediment samples associated with all active stormwater outfalls from the site to Marcus Hook Creek; and

- Preparation of a report describing the following: historical plant operations; raw and waste material handling practices; the results of soil, fill, sediment, surface-water and ground-water sampling and analysis; the distribution of impacted soil and ground-water at the site; the potential for compound migration and migration pathways; and potential receptors of site-related hazardous compounds or constituents.

A site plan showing the distribution of sampling conducted as part of this site assessment is presented as Figure 3. The rationale for each sampling location, analytical parameter selection, and results are fully described in this report. Documentation of adherence to required quality assurance procedures for field sampling, data reduction, and data validation is also presented.

This report is divided into 10 sections, comprising six volumes, with tables, figures, plates and appendices located at the back. Section 2.0 of this report describes the environmental setting including site setting, topography and drainage, geology, and hydrogeology. Section 3.0 presents the site history with emphasis on ownership, viscose manufacturing processes, raw and

waste material handling; and manufacturing support operations. Section 4.0 summarizes the findings of several previous site investigations. Sections 5.0, 6.0, and 7.0 describe the rational for sample locations and analytes, present a description of the field activities, and summarize results of the soil, surface-water and sediment, and ground-water investigations, respectively. Section 8.0 describes additional investigative activities and results including the tidal influence study, magnetic locator survey, and migration pathway evaluation. Data quality assurance procedures are discussed in Section 9.0. Section 10 presents the findings and conclusions.

2.0 ENVIRONMENTAL SETTING

The location of the site and a site plan showing lot subdivisions are provided as Figures 1 and 2, respectively. The site setting, surrounding land use, topography and drainage, and regional and local geology and hydrogeology are described in the subsections below. Figures 4 and 5, respectively, show the current and historical buildings and features at the site.

2.1 Site Setting

The site is located approximately one-half mile northwest of the Delaware River in the Borough of Marcus Hook, Delaware County, Pennsylvania. Based on a subdivision plan, the site currently comprises 36.32 acres and is divided into 23 lots. The FMC site assessment is focused on 12 lots comprising approximately 14 acres as shown on Figure 2. The site has approximately 1,500 feet of frontage to the north along East 10th Street, and is bounded by Marcus Hook Creek and a Conrail spur line to the east and west, respectively. There is a four acre parcel south of Lot 16 which was previously part of a waste-water treatment plant and is currently owned by Marcus Hook Processing Inc. (MHPI), a wholly-owned subsidiary of Envirosafe Services, Inc. Surrounding land use in the immediate vicinity of the site is shown on Figure 6.

Approximately half of the property is currently developed, with a total of 12 existing buildings. The area improved with buildings represents approximately one fifth of the total area of site. The buildings range from 2 to 5 stories and are typically of older brick construction. The remainder of the site is currently undeveloped with the exception of a new road, Penn Avenue, which cuts through the site. Many of the undeveloped lots previously contained buildings which have been demolished, leaving concrete foundations, open basement and tunnel structures, loose rebar and concrete, and other building materials and rubble on the surface. A number of the lots contain sparse to heavy amounts of grassy vegetation with the most significant trees and vegetation found along Marcus Hook Creek.

According to the Borough of Marcus Hook zoning map, the site is zoned I-2 and I-4 for planned and special industrial districts, respectively. Areas to the immediate north, west, and southwest are zoned for residential use, with a school located across the railroad tracks, adjacent to Lots 20-22. However, the majority of the area to the east and west, and between the site and the

Delaware River is highly industrialized. The area of the present site assessment is immediately bordered in the following manner: on the east, across Marcus Hook Creek by the British Petroleum (BP) refinery, and across Penn Avenue from Lot 22, by MHPI; on the south by a Conrail rail line and a continuation of the BP refinery; centered within the site is K&S Waste Processors, a number of smaller commercial properties, a Conrail rail line; and on the north, by Route 13.

A number of businesses and organizations presently conduct activities at the site in Buildings 1, 2, 5, 6A and 6B and on Lots 16, 18, and 19. Lots 16, 18, and 19 have been operated by K&S Waste Processors since 1982 as a licensed hospital waste incineration facility. The other businesses are primarily involved in office work or warehousing and distribution. None of the lots under the AOC investigation are known to support business operations at this time.

2.2 Topography and Drainage

The site lies at approximately 20-35 feet above sea level, and slopes moderately from the northwest corner downward to the south and east. There is a steep drop of approximately 20 feet on the east side of the site down to Marcus Hook Creek. There is a less pronounced slope of approximately 10-15 feet on the western and southern boundaries. The area to the south of the site flattens out and slopes gently toward the Delaware River.

The site itself appears to be situated on a localized topographic high which was further built up by backfilling and grading. This observation is supported by the approximately 10 feet of elevation difference between the site and the property on the opposite side of Marcus Hook Creek. The site itself is mapped as being mostly outside the 100 year flood plain.

The site is located within the Delaware River Drainage Basin. Surface-water runoff from the site is discharged via sheet flow or a storm sewer network directly to Marcus Hook Creek, a tributary of the Delaware River. To the immediate south and west of the site are several low lying, poorly drained areas which occasionally exhibit standing water. A more complete discussion of potential migration pathways is provided in Subsection 8.2.

2.3 Geology

The regional geology is summarized below based on published reports. The site geology is then refined and placed within a regional context using previous site investigation reports, site reconnaissance, data available from 10 soil borings, and data produced from over 81 test pits. Due to site specific conditions, the site geology discussion includes review of the character and distribution of fill materials. The general findings and conclusions are discussed below. The methods of investigation and documentation of results are fully described in Sections 5, 6, and 7. A review of migration pathways, including hydrogeologic avenues, is presented in Section 8.0.

2.3.1 Regional Geology

The site is located immediately southeast of the regionally mapped Fall Line, a physiographic boundary separating the Piedmont Province to the northwest and the Coastal Plain Province to the southeast. According to available regional geologic publications [6,7,8], the Marcus Hook region is directly underlain by deposits mapped as Quaternary age Trenton gravel. Included in the Trenton gravel deposits are localized deposits of Recent alluvium and swamp deposits, emplaced by fluvial processes related to the present channels of the Delaware River and its principal tributaries. The Trenton gravel formation is described as consisting of grey or pale reddish brown gravelly sand. The Recent deposits are described as flood plain and channel deposits of clay, silt, sand, and some gravel. Detailed information is not available regarding the location or existence of these deposits in Delaware County, south of Philadelphia.

The Quaternary Age deposits overlie Precambrian to early Paleozoic age metamorphic and crystalline bedrock. The primary bedrock formation in the region is the Wissahickon Schist. The upper surface of the Wissahickon Schist is typically marked by a few feet to tens of feet of weathered, residual gray micaceous clayey soil. This natural soil zone becomes tighter and more granular with increasing depth, eventually grading into weathered and then competent bedrock. The unconsolidated Quaternary and Recent deposits thin as they move away from the Delaware River toward the Fall Line.

The Soil Conservation Service of the United States Department of Agriculture maps the soil in the area of the site as Made Land[9]. Made Land includes areas where the profile of the natural soil has been disturbed, replaced or covered by earth moving equipment for urban or industrial development. As will be shown in the site geology section discussed below, this description is a more accurate representation of the shallow soil materials at the site rather than the published regional descriptions.

2.3.2 Site Geology

Local site geology has been defined based on data developed from the following sources: six soil borings installed under the supervision of Roux Associates, Inc.; 81 test pits excavated under the supervision of Roux Associates, Inc.; soil borings and test pits installed and excavated under the supervision of other investigators; and regional publications. Figure 3 shows the locations and illustrates the broad distribution of site-specific data included in this evaluation. Appendix A provides geologic logs and well construction details for site monitoring wells. Appendix B provides test pit logs for test pits and visual trenches excavated on site. The procedures describing the excavation of test pits and the installation of monitoring wells are presented in Sections 5 and 7, respectively.

Three shallow subsurface zones have been defined based on samples collected during monitoring well installation and test pit excavations. Figure 7 is a monitoring well location map which illustrates the transects, along which hydrogeologic cross-sections A-A' and B-B' were constructed. Figures 8 and 9 provide schematic representations of the three subsurface zones encountered beneath the site.

Directly underlying the site, Zone I consists of organic topsoil which has frequently been replaced by 3 to 10 feet of various man-made fill materials. These materials include gravel and silty clayey sand with brick, wood, concrete, other building material, assorted pipes, wire, thin aluminum sheets, 0.5 to 4-feet thick layers of coal and/or ash material, and other associated debris. In several areas, the Zone I fill material appeared to extend to depths as great as 13 feet below ground surface (BGS). Zone I is consistent with the regionally mapped soil unit, Made Land, and may partially explain the difference in the elevation of land surface on either side of Marcus Hook Creek.

Underlying the fill material, Zone II consists of approximately 5 to 13 feet of stiff to very stiff silty clay to clayey silt with mica, varying amounts of sand, and interspersed sand-dominated lenses or quartz veins. The silty clay to clayey silt is typically mottled grey-tan and occasionally yellow or red-brown in color. Where the fill material is thicker, Zone II can be less than three feet in thickness and even non-existent. The mica content appears to increase with depth through Zone II and the remnant bedrock structure is evident at the base of this unit.

Zone III consists of quartzitic, mica-rich, saprolite and weathered schist bedrock. The top of this unit is encountered at depths of approximately 12 to 18 feet BGS and is clearly distinguished by its "salt and pepper" appearance. The saprolite and weathered bedrock subunits are too gradational to subdivide further. The typical mineral assemblage is quartz-muscovite-biotite with occasional traces of extremely weathered garnets. In the saprolite, the micaceous minerals are moderately altered to clay, producing a talcy texture. The relic bedrock structure is better preserved than in the overlying Zone II. Split-spoon penetration failure occurred in this zone, but the material was easily augered and competent bedrock was not encountered to a maximum depth of 30 feet BGS.

The cross-sectional profile for the three identified subsurface zones is typical of a weathered in-situ soil profile for a schist. The facility is believed to rest on an erosional terrace, which is higher than the present Delaware River system floodplain. The formation of the erosional terrace exposed Wissahickon Schist bedrock, which formed a soil profile typical of the Piedmont Province prior to being industrialized, excavated, filled, and built up.

Distinct contacts between soil zones were difficult to establish at many locations because of the gradational nature of the profile. Even the basic matrix of the fill material from Zone I often resembled Zone II material. Often, the only way to differentiate Zone I from Zone II was from the presence or absence of obvious artificial materials. Unconsolidated deposits of Quaternary Age were not believed to be encountered. Rounded, gravelly material encountered on Lots 11, 12, 15, and 17 at depths ranging from 7 to 12 feet BGS, is interpreted to be fill material related to construction foundations.

2.4 Hydrogeology

The regional hydrogeology is briefly summarized below based on limited available published reports. The site specific hydrogeologic conditions are defined using site reconnaissance, previous site investigation reports, data available from 10 on-site monitoring wells, and a tidal influence study. The general findings and conclusions are discussed below. The methods of investigation and documentation of results are fully described in Sections 7 and 8. The relationship between certain migration pathways and site ground-water conditions is presented in Section 8.0.

2.4.1 Regional Hydrogeology

Regional publications indicate that neither the Quaternary or Recent age Coastal Plain deposits, nor the weathered Wissahickon clay zone are important sources of ground water in the area[6,7]. In general, these deposits exhibit low transmissivity. Wells yielding approximately 10 gallons per minute (gpm) or greater are typically only encountered in the competent bedrock. The most successful wells in the area are those which intersect bedrock fractures. In general, shallow ground water in the region flows southeast to the Delaware River or its tributaries, such as Marcus Hook Creek. Because the Delaware River serves as a regional discharge zone, the natural vertical hydraulic head is expected to be upward with flow from the bedrock system to the shallow aquifer. Gradient reversals due to local pumping conditions are possible, but data pertinent to site conditions is not available.

2.4.2 Site Hydrogeology

Ground-water flow within shallow unconsolidated materials beneath the site is to the southeast toward Marcus Hook Creek, with a minor component of flow to the south toward the Delaware River. Ground-water elevation data were collected on an approximately monthly basis from April through October 1992 (see Table 1), and associated contour maps are provided as Figures 10 to 17. This series of figures demonstrates that flow direction is consistent over time. The average ground-water elevation fluctuation between the highest and lowest observed conditions during the six month period was approximately 1.5 feet. The observed depth to water ranged from approximately 2 feet BGS in MW-2 to approximately 13 feet BGS in MW-1. This difference is logical given the topographic and hydraulic head differences between these two

wells. The average hydraulic gradient across the site is approximately 0.01 ft/ft. Hydrogeologic cross-sections are provided as Figures 8 and 9, with the transect lines shown on Figure 7.

Observations recorded during drilling activities indicate that ground water generally occurs under unconfined conditions beneath the site. As shown on the hydrogeologic cross-sections, the water-table is located within Zone II which is predominantly a silty clay material. Perched or possibly semi-confined conditions occur in looser or relatively more permeable material overlying, underlying, or interlayered with relatively impermeable Zone II clay-rich material. Published sources indicate that typical values of hydraulic conductivities for the water-bearing material beneath the site range from 0.001 to 0.01 gallons per day per square foot (gal/day/ft^2) (Driscoll, 1986).

A 24-hour tidal fluctuation study was conducted to determine the effect, if any, of the tides on ground-water conditions beneath the site. The study indicated that in the vicinity of the site Marcus Hook Creek is within the tidal range of the Delaware River and experiences surface-water fluctuations of approximately 4.5 feet. This is consistent with expected findings for this location[10]. Three monitoring wells, MW-3, MW-6, and B-3, showed no ground-water response over the tidal period. The well locations and the results of the tidal study are shown on Figures 7 and 18, respectively. Monitoring well MW-1 was originally planned for the study, but was vandalized and could not be used. Previous field observations of pressure buildup in this well due to hydraulic fluctuations suggests the possibility of localized tidal influence. In summary, tidal influence was not observed during the study. If there is any influence, it is localized to the southern portion of the site directly adjacent to Marcus Hook Creek. The absence of tidal influence in the shallow unconsolidated aquifer across the site is logical since the water table is located in a low transmissivity silty clay zone.

2.4.3 Potential Receptors

Potential downgradient receptors of ground water flowing from the site include Marcus Hook Creek and, indirectly, the Delaware River. Based on a three-mile well survey conducted by a NUS Corporation Field Investigation Team contracted by the USEPA Region III, residents in the area of potential impact do not utilize private wells or local surface-water as a source of potable supply. The survey covered portions of New Jersey, Pennsylvania, and Delaware and

was extended well beyond the reasonable area of potential impact. The Pennsylvania portion of the three-mile study area is reportedly supplied with potable water from the Octorara Reservoir in Lancaster County, over 35 miles west of the site, by the Chester Water Authority. The Delaware portion of the three-mile study area is supplied with water from the Red Clay and White Clay Creeks in Delaware by the Wilmington Suburban Water Company. The New Jersey portion of the three-mile study area, across the Delaware River, is not serviced by a public water system but this is outside the potential influence of site conditions. The study indicated that no surface-water intakes exist on the Delaware River within the three-mile area.

3.0 SITE HISTORY

An extensive file search was conducted to obtain and review available background information for the site. Activities conducted included the following:

1. A review of aerial photographs from the years 1940, 1964, 1973, 1979, and 1986.

2. A review of remaining FMC files.

3. Interviews with previous FMC employees and utility companies servicing the site.

4. A review of the Pennsylvania Department of Environmental Resources (PADER) and Marcus Hook Borough files.

5. A review of over a hundred drawings available at the site and at an office of the property manager.

6. Numerous phone conversations with various state and local officials.

7. A review of public information available in the Borough of Marcus Hook Public Library.

Table 2 provides a summary of file review sources used by Roux Associates, Inc. in the formulation of specific sections of this site assessment report. The following subsections describe the ownership history, manufacturing process, raw and waste material handling, and manufacturing support operations. Additional detail for each lot covered under the AOC investigation is provided in Section 5.0 where sample locations and analytical parameters are explained based on potential former source areas.

3.1 Ownership History

The East Tenth Street site is a former viscose rayon/cellophane manufacturing facility built by Courtalds, Ltd in approximately 1910 and owned and operated by various Courtalds, Ltd. subsidiaries and the American Viscose Company until approximately 1963. In 1963, the site

was sold to FMC Corporation which continued to operate it as a viscose cellophane plant until about January 1975 when manufacturing operations were terminated and the site was prepared for sale. The site was sold to Marcus Hook Development Park, Inc. (MH Park) in 1978. After purchasing the property, MH Park auctioned and salvaged equipment, piping, and other structures at the site. MH Park sold an approximately 4-acre parcel of the property which contained a waste-water treatment plant to IU Conversions Systems in 1979. This parcel was later purchased by MHPI. In 1986, the site was sold to the Marcus Hook Business and Commerce Center (MHBCC). The MHBCC attempted to renovate some buildings and portions of the site and to demolish and develop other portions of the site. In addition, MHBCC divided the site into 23 separate lots. According to USEPA findings, MHBCC sold the tracts to various individuals as well as keeping some themselves including those containing Buildings 2, 6a and 6b, and Lot 23. Given the complicated history of the site, it is not known who is the official current owner of each of the 23 lots. Marcus Hook Borough tax records do not clearly identify ownership for all 23 lots.

3.2 General Overview

The site operations are relatively well defined from original construction of the facility in the early 1900s to FMC's cessation of operation in 1975. The manufacturing processes were straightforward and consistent over time during this period. While there were certainly modifications and upgrades, the basic production processes did not change. The earliest available aerial photograph from 1940 revealed that all of the major manufacturing facilities and associated support operations were present. The site history is further simplified by the fact that the property was only used for viscose rayon/cellophane manufacturing from the 1900s to 1975. The most significant manufacturing modification was a shift from rayon to cellophane production in the late 1950s. The basic viscose manufacturing process is essentially the same for both rayon and cellulose. The primary importance of this change was the addition of a coating finishing step which involved application of several solvents and lacquer solids.

The manufacturing process for viscose rayon/cellophane was relatively straightforward. The viscose process breaks down large chain cellulose molecules derived from a wood pulp, and regenerates the cellulose under controlled conditions to obtain a more uniform polymer. The basic manufacturing steps included steeping, shredding, churning, mixing, aging, extrusion

and/or spinning. The products were then washed, bleached and dried, and in the case of cellophane, coatings were applied. The major raw materials included cellulose, sulfuric acid, sodium hydroxide, carbon disulfide, solvents, and lacquers.

The basic manufacturing was conducted in the center of the site on what are currently known as Lots 15, 17, and 23 (see Figures 4 and 5). The solvent storage, coating operations, packaging and shipping were located on the west side of the site. Support operations such as waste-water treatment, incineration of off-specification products, cooling water, power generation and fire protection were located to the south and east of the production area. The offices, cafeteria, garages, fire company and parking lot were located to the north along East 10th Street.

A more detailed discussion of the manufacturing process, viscose chemistry, and environmentally pertinent support operations is provided in the following subsections. The correlation between site operations and design of the AOC investigation is deferred to Section 5.0. In Section 5.0, the potential source areas are defined for each lot under investigation, and are used to explain the sample locations and analytical parameters selected.

3.3 Manufacturing Process and Chemistry

A schematic of viscose operations showing the rayon and cellophane manufacturing process is shown in Figure 19. Site plans showing current lot subdivisions and former plant and process buildings are included as Figures 4 and 5, respectively. The rayon and cellophane manufacturing processes are described below.

Delignified wood pulp (cellulose), is the basic feedstock for the process. This material was delivered to the FMC plant in bulk and was stored in the building labeled pulp storage on Lot 17. The cellulose pulp was initially reacted with sodium hydroxide to form alkali cellulose; a process called "steeping." The chemical reaction is shown in Equation 1 below:

$$R\text{-}OH + NaOH \rightarrow R\text{-}O\text{-}Na + H_2O \qquad \text{(Eqn. 1)}$$

Cellulose + Sodium hydroxide → Alkali cellulose + Water

This process was conducted in the mercerizing building formerly located on Lot 15. The raw pulp came from Building 17 and the sodium hydroxide was stored in small tanks located between Lots 15 and 17. The small tanks were filled from the three bulk tanks shown south of Lot 17. The bulk tanks were supplied by rail as needed.

The alkali cellulose would expand during the steeping process and had to be pressed to remove excess liquid. The reclaimed liquid was directed back to the steeping process, and the pressed alkali cellulose was shredded into crumbs and placed into cans to be aged for approximately 24 hours. Once aged, the alkali cellulose crumbs were reacted under vacuum with carbon disulfide to form cellulose xanthate, which was then dissolved in sodium hydroxide to form a solution. This solution was commonly known as "viscose" due to its high viscosity. The chemical reaction is shown as Equation 2 below.

$$R\text{-}O\text{-}Na + CS_2 \rightarrow R\text{-}O\text{-}\overset{\overset{S}{\|}}{C}\text{-}S^-Na^+ + NaOH \rightarrow \text{Viscose} \qquad \text{(Eqn.2)}$$

Alkali cellulose + Carbon disulfide → Cellulose xanthate, dissolved in Sodium hydroxide to form viscose

All of these activities took place in the Churn Mixing Building, located on Lot 17. The carbon disulfide was stored on Lot 19 and metered into the production process. The underground storage tanks were supplied by rail and were carefully monitored due to the fire hazards associated with carbon disulfide.

The viscose solution was piped directly from the Churn Mix Building to the viscose cellar beneath Lot 23 for aging. The aging was conducted in stainless steel tanks ranging from 1,000 to 2,500 gallons in size. After approximately 2-4 days, the aged viscose was ready to be regenerated into rayon or cellophane. The solution was filtered to eliminate any impurities, and extruded into a sulfuric acid bath. Depending on the shape of the discharge jet, the final product was in fiber or sheet form. The chemical reaction is shown as Equation 3 below:

$$R\text{-}O\text{-}\overset{\overset{S}{\|}}{C}\text{-}S^-Na^+ + H_2SO_4 \rightarrow R\text{-}OH + Na_2SO_4 + CS_2 + H_2S \qquad \text{(Eqn.3)}$$

Cellulose xanthate + Sulfuric acid → Regenerated cellulose + Sodium bisulfate + Carbon disulfide + Hydrogen sulfide

All of these activities took place on Lot 23. The sulfuric acid was pumped via an overhead pipe bridge to the spinning area. The acid was diluted with water and placed into lead lined vessels for use in spinning. After spinning, the rayon or cellophane was washed, dried and directed to finishing operations. The liquid waste spent acid containing sodium sulfate was piped to the acid reclaim area on Lot 12 for recovery of acid and removal of sodium sulfate. The off-gases from the spinning process contained carbon disulfide and hydrogen sulfide which were discharged to the atmosphere from the fume stack on the east side of Lot 23. Off-specification product was directed to Lot 13 for incineration and later disposed of off site.

The final rayon products were washed with water and dried. The cellophane products were dried to remove residual moisture, and coatings were applied to modify the physical properties of the final product. The solvent storage, lacquer storage, solvent recovery, and coatings building were located on Lots 20-22. The solvents used in this process included ethanol, ethyl acetate, tetrahydrofuran, and toluene. The solvents served as carriers for the lacquer solids used for coatings which included polyvinyl chloride, polyvinylidine chloride, and nitrocellulose. Other coating materials used included coloring agents, food grade wax emulsifiers, and slip agents. Storage, packaging and shipping occurred in the buildings on Lot 6.

3.4 Support Operations

The major support operations included power generation, acid reclaim, incineration, waste-water treatment, coating operations, a machine shop, a lead shop and research and development facilities. These are discussed in more detail below.

The powerhouse is mostly located on Lot 9. Large boilers were used to produce steam which in turn drove turbines which produced electricity. The fuel source for the powerhouse was originally coal, but later switched to fuel oil. The raw coal was stored directly on the ground and small seams of residual coal have been observed in the subsurface. At one time, the ash generated from burning the coal was also deposited on site. Oil was piped directly from the B.P. refinery to the powerhouse via an overhead pipeline across Marcus Hook Creek. An aboveground fuel oil tank was associated with the powerhouse. The sprayponds located on Lots 10 and 11 may have contained boiler water treatment chemicals.

The acid reclaim system was a closed loop process which was located on Lot 12 and was used to conduct various evaporation and crystallization operations in conjunction with recovery of sulfuric acid and removal of sodium sulfate from the spinning waste liquids. The materials which were present included concentrated sulfuric acid, dilute sulfuric acid, sodium sulfate in either low or high pH solutions, and sodium hydroxide.

The incinerator located on Lot 13 was used to burn off-specification product. The fuel source for the incinerator was coal. A large coal storage area covered the majority of Lots 13 and 14. The incineration operations reportedly ceased in the early 1960s, so this building was not upgraded to fuel oil. The raw coal was stored directly on the ground and seams of coal dust and coal chunks are present in the subsurface. When saturated with water, the coal dust could be described as a black sludge.

The waste-water treatment plant located south of Lot 16 was originally constructed in 1945 by American Viscose Corporation. The waste-water treatment facility was modified in 1957 to include sludge dewatering and two earthen sludge lagoons. The system was designed to remove metallic hydroxides such as lead and zinc, and some organic matter derived from cellulose. The waste-water treatment facility received the industrial waste waters generated from the steeping and churn mix operations. The bulk sodium hydroxide tanks were also located in this area.

The coatings operation was located on Lots 20 through 22 and was used as a finishing step in the manufacturing of cellophane. The basic operations and chemicals used were previously described along with the manufacturing process. The solvent storage area contained approximately 30 USTs which were removed in 1988 under the supervision of PADER personnel. The tank removal contractor reportedly pumped the water contents of a number of tanks directly to the ground prior to PADER halting this practice.

The solvents in this area were pumped via above-ground piping to the lacquer mix area where they were mixed with lacquer solids. Alcohol was also used as a carrier for the coating products. The lacquer was piped to the coatings building on Lot 20 for application to the cellophane. The solvents would evaporate leaving behind a clear or colored, usually glossy surface coating of natural or synthetic solids. The type of solvent and solid used depended upon

the coating properties desired. The evaporated solvents and alcohols were directed to the solvent recovery and alcohol distillation buildings, respectively, located on Lot 20.

The machine shop and lead shops located on Lots 18 and 15, respectively, provided general plant maintenance and support. The machine shop would be expected to contain various paints, oils, and solvents in limited quantities. The lead shop was in the basement of the east side of Building 15 and may have contained lead in sheet form and lead dust.

There were several research and development areas at the site. While information is not available on their specific operations, they would have had limited material usage. The activities would have been focused on quality assurance and improving production methods and yields. The types of materials used would be similar or the same as those employed in the viscose process itself.

4.0 PREVIOUS SITE INVESTIGATIONS

Roux Associates, Inc. has conducted an extensive search for available file materials pertaining to subsurface investigations at the site. A summary of the file search sources is provided on Table 2. A chronological summary of information obtained is provided as Table 3. Much of the information obtained was incomplete copies of reports or references to reports in documents other than the original. The two most useful documents were an NTH assessment[11] of tank removal operations on Lot 22 and a Roy F. Weston[12] assessment of subsurface conditions on Lots 8-14, 15, and 17. Descriptions of these two site investigations and a chronological summary of historical regulatory involvement are provided below.

4.1 Regulatory Involvement

Site environmental investigations were originally initiated in the late 1970s, after FMC sold the property, because of complaints of the improper handling and disposal of asbestos, polychlorinated biphenyl (PCB) oils, and PCB-containing transformers during the demolition of a number of the buildings and the salvaging of building and process machinery materials. The Pennsylvania Department of Environmental Resources (PADER) conducted an asbestos survey of the site in April 1979 and ordered an on-site asbestos landfill closed in September of 1979. After further investigation, PADER ordered on-site asbestos to be removed to a landfill. In 1983, 6 samples of suspected asbestos material were collected near the property line and all samples contained one or more asbestos minerals. In 1984, the USEPA investigated complaints of asbestos that continued to be found on plant grounds. A sample was taken, which confirmed the identification of the material as asbestos; however, no further action was taken.

As a result of the discoveries found during site investigations concerning the handling of asbestos, PCB-containing equipment, and other salvaged materials, a number of general site assessments were conducted by various regulatory agencies and consultants to determine the overall environmental conditions existing at the site. In 1986, PADER conducted a preliminary site assessment of the site and concluded that a site inspection should be conducted on a time available basis. The PADER Preliminary Assessment Report included the results of the 1988 non-sampling site reconnaissance conducted by an NUS Corporation field investigation team. These site inspections indicated observations of various oily stains and white salty precipitates

on the grounds, as well as powerhouse ash, fill, and materials of unknown origin along the length of the Marcus Hook Creek border. Observation wells for monitoring of hazardous waste activities at MHPI were observed and gauged for water-level elevations.

Another area of concern identified during the 1986-1988 site inspections was a solvent storage tank farm located on Lot 22. In 1988, PADER began overseeing the removal of 30 underground solvent storage tanks from Lot 22 by MHBCC. The tanks were believed to have been filled with water after the removal of product and/or raw materials. Initially, during removal activities, tank contents were discharged to the ground. Following PADER's correction of this practice, the tanks were subsequently sampled to gain approval to discharge the waste water to public sewers and to dispose of the tanks. Tank content sampling was conducted by Cassar Technical Services, and the following volatile organic constituents, along with their maximum concentrations in parts per billion (ppb) were identified: benzene (848 ppb), ethylbenzene (128 ppb), toluene (252,000 ppb), chloroethane (35.1 ppb), chloroform (5.7 ppb), methylene chloride (1,710 ppb), 1,1-dichloroethane (9.0 ppb), 1,2-dichloroethane (4.4 ppb), 1,1-dichloroethene (18.9 ppb), trans-1,2-dichloroethene (20.0 ppb), 1,1,2,2-tetrachloroethane (1.8 ppb), and tetrachloroethene (5.8 ppb). Soil sampling associated with the removal of these tanks also indicated the presence of many of the above-referenced organic constituents. In correspondence from PADER to MHBCC dated May 26, 1988, PADER suggested that, following the removal of all tanks, MHBCC hire a qualified consultant to evaluate the extent of soil and/or ground-water contamination in this area and develop and implement a remedial plan, if necessary. There is no evidence that this was ever completed by MHBCC.

On November 1, 1990, USEPA conducted an investigation at the site which included sampling of several on-site drums located in Building 3. USEPA found PCBs in 12 of the 43 drums tested in this building. On November 8 and 9, 1990, USEPA conducted an emergency assessment of the site. During its investigations at the site, USEPA representatives reported observing improper disposal of asbestos, PCB-containing substances, as well as other possible toxic chemicals. From this point on, a series of events took place that ended in unilateral Administrative Orders (AOs) being issued on December 21, 1990 which required MHBCC, Strath-Haven Reality, Inc, Dennis Marchunk and Jeanie Alverez to undertake certain removal response actions at the site. An AOC was subsequently executed on March 13, 1991 between

the USEPA and FMC to perform certain activities including subsurface assessment activities on Lots 8-14, 15, 17, and Lots 20-22.

4.2 NTH Assessment

During 1990, NTH Consultants, Ltd. (NTH) was retained by the Marcus Hook Development Authority to conduct an assessment of the solvent storage tank area on Lot 22. The objective was to determine whether contamination in the solvent storage tank area warranted further activities. The overall conclusion by NTH was that the severity of concentrations of hazardous substances detected was limited. NTH concluded that contaminant mobility was minimal, resulting from the relatively low permeability and chemical nature of the underlying clayey silt soils. Specific findings are discussed in the following paragraphs.

A large pit on Lot 22, resulting from cumulative tank excavations, was observed to be filled with water, presumably resulting from rain and subsequent runoff. With regard to this water, NTH recommended contacting the local publicly owned treatment works (POTW) to determine if this water could be pumped into the nearest sewer access point. It is uncertain as to how this water was actually disposed. It is also unknown how, and with what material, the large pit was subsequently filled.

Solvents that were identified in the various storage tanks included: toluene, ethyl alcohol, butyl alcohol, ethyl acetate, and tetrahydrofuran. Soil samples collected by NTH from depths ranging between 7 and 11 feet BGS from test pit excavations yielded the following maximum volatile organic compound analytical results in parts per million (ppm): toluene (0.32 ppm), benzene (0.090 ppm), ethylbenzene (0.062 ppm), xylene (0.063 ppm), ethyl acetate (53 ppm), and butyl alcohol (0.6 ppm). The highest concentrations of volatile organic constituents were found in loose fill material overlying the former storage tank farm area. Concentrations in compacted fill material and virgin soil outside the storage tank area were reported to be non-detectable or considerably lower than in the storage tank area. Concentrations of metals detected in samples from the surface and from the subsurface within the former storage tank area were minimal and deemed to be within normal background conditions for soils in an industrial area. Samples from the fill material contained total petroleum hydrocarbon (TPH) and total benzene, toluene, ethylbenzene and xylenes (BTEX) concentrations greater than PADER's recommended

remediation guideline levels, whereas samples collected from original soil or well compacted fill (including one perched water sample) contained concentrations below PADER's remediation guideline levels. NTH recommended the removal or treatment of the fill material only. There is no evidence that the recommendation was ever implemented.

4.3 Weston Assessment

Weston was retained by the law firm of Huggler & Silverang, in June 1990 to identify major areas of environmental concern for certain portions of the site. The Weston site assessment was conducted in two phases, non-sampling and sampling. Conclusions and recommendations described in the Weston report are summarized in the following paragraphs.

The overall conclusions from the Phase I investigation were that, prior to further development, asbestos and drums filled with unknown liquids should be removed from existing buildings, leaking transformers from Building 1 and Building 17 should be repaired or removed, and demolition debris should be removed from the site with a qualified person present to determine if any hazardous materials were uncovered that would require special treatment. There is no record of how these recommendations were implemented.

A Phase II site investigation was conducted to characterize site geology and hydrogeology, as well as the nature and extent of soil and ground-water contamination. A number of test pits and four monitoring wells, B-2 through B-5, were installed as part of this assessment. Split-spoon samples from three borings were taken from the 3-5 feet depth interval. One split-spoon sample from one boring on Lot 17 was collected at a depth of 15 feet, where staining and odor was reportedly observed by Weston personnel. Test pit samples were generally composite samples. These soil samples, along with ground-water samples from wells B-2 through B-5, were submitted for analysis of TPH, priority pollutant metals and priority pollutant volatile organic constituents (VOC) concentrations.

Soil sample analytical results indicated that TPH levels in soils collected from Lots 10 through 13 ranged from non-detectable to 6,300 ppm. The greatest concentration of TPH in soil was 12,000 ppm and was found on Lot 17. Soil samples with high TPH concentrations were also associated with high levels of lead, cadmium, mercury, and zinc, and Weston suggested waste

oil as a possible source of this contamination. The highest concentrations of metals were found on Lot 17, with the exceptions of arsenic, which was highest on Lot 10, and mercury, which was highest on Lot 12. The highest observed concentrations of the metals of concern were found to be as follow: arsenic (15.3 ppm on Lot 10, and 13.4 ppm on Lot 17); cadmium (10.4 ppm on Lot 17); chromium (383 ppm on Lot 17); copper (1620 ppm on Lot 17); mercury (120 ppm on Lot 12, and 13.4 ppm on Lot 17); nickel (337 ppm on Lot 17); lead (7,620 ppm on Lot 17); antimony (179 ppm on Lot 17); and zinc (3,500 ppm on Lot 17). Weston observed that the high concentrations of mercury and cadmium found on site were two orders of magnitude greater than the range of concentrations of these elements found in typical background soils. The high lead concentrations were observed to be one order of magnitude higher than typical background soils. Few volatile organic compounds were detected in soil samples collected from the site. Carbon disulfide was detected on Lot 13 and Lot 17, ranging from 0.003 ppm to 0.016 ppm. One soil sample from Lot 17 was also found to contain chlorinated compounds including 1,1-dichloroethene, trichloroethane, trichloroethylene, and tetrachloroethylene, all at concentrations below 0.010 ppm.

Ground-water samples reportedly did not contain metal concentrations that exceeded the maximum contaminant levels (MCLs) established for ground water by the USEPA. Zinc was the most common metal, found at concentrations of 1,430 ppb and 1,570 ppb in monitoring wells B-3 and B-5, respectively. Nickel was also found at concentrations of 492 ppb and 326 ppb in B-3 and B-5, respectively. The concentrations of metals in these wells were reportedly associated with acidic conditions (pH values below 5 standard units) and high specific conductance. Ground water from only one well, B-4, located near the Churn and Mix Building, contained elevated concentrations of volatile organic compounds. Trichloroethylene and tetrachloroethylene were detected in ground water from B-4 at maximum concentrations of 120 ppb and 44 ppb, respectively.

Weston's overall site assessment indicated that the metals in the soil are relatively immobile and have not entered the ground water at levels above the MCLs. Soil impact appeared to be localized around the Churn and Mix Building on Lot 17 and around the area once occupied by the spray ponds and acid tanks. The above-mentioned volatile organic compounds which were detected in the ground water, particularly on Lot 17, were reported to indicate relatively greater

mobility of these contaminants. However, according to the report, ground-water contamination was not found to be overly significant or widespread. Weston suggested that future investigations should be conducted to further delineate the extent of contamination.

5.0 SOIL INVESTIGATION ACTIVITIES AND RESULTS

Subsection 5.1 outlines in detail the soil investigation activities conducted during the performance of this site assessment. The soil investigation results are provided on a lot by lot basis in Subsection 5.2.

5.1 Soil Investigation Activities

This subsection describes the soil sampling program design, equipment and procedures, health and safety, equipment decontamination, sample sequence and numbering, and a summary of samples and analytical methods. A full discussion of quality assurance procedures is provided in Section 9.0.

5.1.1 Soil Sampling Program Design

Soil samples collected at the site were divided into biased and non-biased samples. Table 4 lists all samples collected at the site and identifies samples as either biased or non-biased. The locations of all sample points are illustrated in Figure 3. The soil sample points are also illustrated on a lot by lot basis in Figures 20 through 22.

The purpose of the biased soil and/or fill sampling was to evaluate identified, suspected, or likely source areas. The selection of biased soil sampling locations and depths was based on reconstruction of historical on-site operations, verbal recommendations made by the USEPA, original site maps, blueprints, engineering drawings, and historical aerial photographs. Observations made during site reconnaissance and during actual sampling activities were also used in the selection of the biased sampling points. All additions or deletions to the USEPA-approved Workplan are described in the comments section of Table 4.

The primary purpose of the non-biased soil sampling was to evaluate general site conditions and identify potentially unknown or unsuspected source areas. Non-biased grid sampling removes investigator bias and aids in systematically sampling large areas. The proposed non-biased sampling initially consisted of superimposing a 100-foot square grid pattern over target areas of the site, with the northwest corner of Lot 9 acting as the reference starting point. The objective of this method was to identify sampling points at predetermined distances from each other.

However, due to physical sampling constraints, such as concrete foundations and lot boundaries, some non-biased sample point locations were inaccessible and required adjustment from the original Workplan. The modifications were minor and did not jeopardize the intent of the non-biased program. Most field modifications were discussed with the USEPA's oversight contractor prior to implementation.

A secondary purpose of the non-biased sampling was to investigate the nature and extent of the fill material and to evaluate the quality of the natural subsurface soil below the fill. This was accomplished by collecting samples from approximately 0 to 6 inches (or 1 foot) BGS and from approximately 0 to 6 inches (or 1 foot) below the base of the artificial fill material. As described in Section 2.4.2, the contact between Zone I (artificial fill) and Zone II (natural silty clays and clayey silts) was often difficult to establish in the field. In cases where the contact between Zone I and Zone II could not be established in the field, non-biased sampling was typically accomplished by collecting a shallow sample and a sample near the maximum extent of the excavations.

5.1.2 Soil Sampling Equipment and Methods

Soil and/or fill was sampled at the site by the following three methods: surface or near-surface manual sampling; machine-assisted sampling during excavation activities; and split-spoon sampling during drilling activities. The first two of these methods are discussed below, whereas split-spoon sampling is described in Section 7.0. Both manual sampling and machine-assisted sampling were employed for biased and non-biased sample points.

Manual surface sampling was conducted using either pre-packaged, disposable sterilized plastic spoons and scoops or pre-cleaned stainless steel hand-augers, trowels and spoons. Surface or near-surface material to be sampled was identified and spooned or scooped into sample containers using the above-mentioned sampling equipment.

Machine-assisted sampling was utilized during test pit excavation and trenching activities. Machine-assisted sampling was conducted using a backhoe bucket and pre-packaged, disposable plastic spoons and scoops. A track-mounted Komatsu PC-2000 excavator was used to conduct the excavation activities. Enroserv, Inc. was used as a subcontractor to conduct the excavation

activities. The trackhoe was generally necessary when samples were collected from depths or when heavy surface debris needed to be cleared to collect a surface or near-surface sample. The backhoe was also used in near-surface sampling when test pits were excavated for the collection of both shallow and deep samples. After determining the depth of the sample to be collected in the test pits, accurate collection of this depth range was ensured by visibly guiding the backhoe operator with hand signals to the sidewall depth of interest. Samples were then collected from the backhoe bucket using the plastic spoons or scoops.

All samples were transferred into laboratory supplied containers of appropriate size and construction based on the analysis required. Where sample material to be collected appeared to be heterogeneous, samples were spooned into large stainless steel mixing bowls and homogenized, prior to being placed in laboratory-supplied containers. This procedure was not conducted for samples to be analyzed for volatile organic constituents. Sample jars were labeled with sample identification, project name and number, sampler's initials, date and time the sample was collected, and the analytical method to be performed. Preservation requirements for soil samples included ice only. Where sample locations were collected for multiple parameter analysis, the VOC-designated sample (if applicable) was collected first, the semivolatile-designated sample (if applicable) was collected second, and samples designated for all other analyses were then collected. Disposable latex or nitrile gloves were worn throughout sample collection and container handling to avoid cross-contamination.

A mobile sampling van was used to carry sampling equipment, health and safety equipment, and samples to and from an on-site trailer with a designated decontamination station. Air monitoring was conducted throughout sampling, backhoe decontamination was conducted between test pits, and Roux Associates, Inc. sampling equipment decontamination procedures were conducted at the beginning, between uses, and end of sampling days. The trailer contained a freezer stocked with blue ice packs provided by the laboratory. Samples were packed in laboratory-supplied shipping coolers with ice packs and shipped to the laboratory daily, using Federal Express priority overnight shipping.

5.1.3 Health and Safety Equipment and Methods

As described in the health and safety plan attached to the USEPA-approved workplan, health and safety equipment used throughout soil sampling activities included an OVA 580B organic vapor meter, other back-up air monitoring equipment, and personal protective equipment suitable for Level D and/or Level C soil sampling. As described in the workplan, continuous air monitoring for total organic vapors was conducted by samplers throughout all sampling activities. Generally, air monitoring determined the level of personal protective equipment to be donned. Disposable latex and/or nitrile gloves were worn at all times during sampling.

All Roux Associates, Inc., personnel, their subcontractors, and any other individuals entering the work area were required to read and sign the Roux Associates, Inc. health and safety plan.

5.1.4 Decontamination Equipment and Methods

Decontamination methods for sampling equipment are described in the SOP for Decontamination of Field Equipment in Attachment 1 of the USEPA-approved Workplan. All sampling equipment decontamination was conducted before and between use in the field at designated decontamination stations. Steam cleaning of the backhoe bucket was combined with a non-phosphate soapy water scrub to remove particularly clayey soils.

5.1.5 Activity Sequence and Sample Numbering System

A pre-sampling site walk-through was conducted with personnel from the USEPA's on-site contractor, Dynamac Corporation, prior to the commencement of soil sampling. During this walk-through, the accessibility of previously planned and USEPA-approved sampling locations were evaluated and minor adjustments to sampling locations were made. These modifications are identified on Table 3 and are fully discussed in Subsections 5.2.1 through 5.2.1.2 below. Close communication with Dynamac personnel regarding the necessity for sample additions, deletions or location modifications, was maintained throughout the soil sampling activities.

Biased samples were designated with a "B" prefix, the lot number from which the sample came, and the number in the planned biased sampling order for the lot from which it came. For example, the third biased sample planned for collection from Lot 10 was designated B1003. Non-biased samples were designated with an "S" prefix (for statistical samples), the lot number

from which the sample came, and the number in the planned non-biased sampling order for the lot from which it came. For instance, the second non-biased sample planned for collection from Lot 11 was designated S1102. Generally, the USEPA-approved final sample list was used for sample designation. When field decisions were made to delete samples, these samples were omitted from the list and not replaced. When field decisions were made to add samples, the sample was added to the list with the next highest available B or S number from whichever lot the sample was collected.

Most biased samples were identified with flags during the pre-sampling site walk-through with Dynamac personnel. A large majority of biased surface or near-surface soil and/or fill samples were collected on April 23 and April 24, 1992 following the site walk-through. Following this initial sampling event, the rest of the soil samples were collected between April 1992 and May 1992. Sampling proceeded in ascending lot order, starting on Lot 8. After sampling, sample points were accurately located by triangulation. Site surveying activities are fully described in Section 7.1.8.

5.1.6 Summary of Samples and Analytical Methods

Table 4 summarizes, on a lot by lot basis, the sample identification, sample depth, the test pit from which each sample was collected, and the reasoning for the sample collection. The analytical methods employed for all soil samples is described in Section 9.0.

5.2 Soil Investigation Results

The analytical results of the soils investigation, including associated QA/QC sample results, have been tabulated on a lot by lot basis and are provided on Tables 6 through 19. In addition, summaries of soil analytical results are shown on a lot by lot basis on Figures 23 through 34. The subsections below discuss, on a lot by lot basis, the results obtained during the soils investigation.

5.2.1 Lot 8

Lot 8 is located in the northeast corner of the East 10th Street site. The earliest available aerial photograph, 1940, indicates this lot has always been a parking lot with a small portion of the former boiler and powerhouse crossing over the Lot 8 and Lot 9 boundary. Aerial photographs

from 1964, 1973, 1979 and 1986 confirm that this area continued to be used for automobile parking. Presently, the lot is partially covered with demolition debris, rocks and brush. There are no signs of obvious environmental impact.

Due to the historical usage of this lot as a parking area, one confirmatory biased sample (B0801) was collected from a central location. In addition, a second biased sample (B0802) was added in the field due to lot size, and was collected from the south central portion of the lot. Sample B0801 was collected from 6 inches to 1 foot BGS and B0802 was taken from silt/sand runoff material. Analysis of the samples included asbestos, PCBs, VOCs, TPH, and pH.

The results of the biased soil sampling on Lot 8 showed no signs of gross contamination. Total volatile concentrations ranged from 0.016 milligrams per kilogram (mg/kg) in sample B0802 to 0.070 mg/kg in sample B0801. PCB concentrations ranged from non-detect (ND) to 1.2 mg/kg in the biased soil samples taken. A TPH analysis performed on biased sample B0802 showed 1,420 mg/kg. Asbestos results for both Lot 8 samples ranged from ND to less than 1 percent (%). The analytical results are provided on Table 6 and summarized on Figure 23.

5.2.2 Lot 9

Lot 9 was the location of the facility boiler and powerhouse which supplied electrical power and steam to the facility. The powerhouse used #6 fuel oil and contained electrical generators, boilers, switchgear, and boiler treatment chemicals. The powerhouse building was demolished between 1986 and 1989, and the excavation was backfilled with demolition debris and fill material. The surface of Lot 9 is composed of uneven soil and scattered demolition debris. A former fuel oil tank foundation is located near the northeastern edge of Lot 9. The remains of the former boiler and powerhouse foundations and floors are visible on most of the western portion of the lot.

Three biased and six non-biased samples were collected from Lot 9. Non-biased sampling points were selected using a 100-foot grid pattern. Non-biased samples were collected at grid points to a maximum depth of 6 feet BGS and were analyzed for one or more of VOCs, PCBs, Target Analyte List (TAL) metals, pH, TPH, and asbestos. A biased sample (B0901) was collected from the interval 0 to 6 inches BGS, adjacent to a concrete pad and analyzed for VOCs, PCBs,

TPH, and asbestos. The USEPA suspected that portions of Lot 9 were used as an asbestos burial area, and previous reconnaissance revealed a potential burial pit. A second sample (B0902) was obtained from 0 to 6 inches BGS at this location and submitted for asbestos analysis. An additional biased sample (B0903) was added in the field, following discussions with Dynamac personnel, in order to test soils in the exposed basement of the razed powerhouse. This sample was analyzed for VOCs, PCBs, TAL metals, and TPH.

The analytical results of the biased and non-biased samples taken on Lot 9 are discussed below. Total volatile concentrations were found to range from a low of 0.025 mg/kg in samples B0901 and S0901 to a high of 0.42 mg/kg in sample S0906. A total base-neutral analysis performed on biased sample B0901 showed 57 mg/kg. PCB concentrations ranged from a low of 0.041 mg/kg in sample S0902 to a high of 2.3 mg/kg in sample B0901. A TPH analysis performed on samples S0906 and B0901 resulted in elevated concentrations of 60,500 and 65,500 mg/kg, respectively. These samples were taken from fuel oil contaminated soils located adjacent to a former fuel oil tank. The area was further investigated via excavation methods using a trackhoe. The visually impacted soils were found to be localized on the southern side of the tank foundation although total delineation was not conducted at the time of sampling. The TPH results of the analysis performed on biased sample B0903 showed 364 mg/kg. Asbestos concentrations ranged from ND in S0904 to a high of 6 to 8 percent (%) in biased sample B0902. Levels for pH on Lot 9 ranged from 5.3 to 8.2 standard units (SU). Twenty one metals were detected in both the biased and non-biased samples collected from Lot 9. The analytical results are provided on Table 7 and summarized on Figure 24.

5.2.3 Lot 10

Lot 10 formerly contained the powerhouse cooling water spray ponds, two substations, an ash pit, and two condensate tanks. The spray ponds have been backfilled with demolition debris. Demolition debris and brush cover portions of the remainder of the lot. Site inspection of the lot revealed a previously excavated area on the eastern side of the lot along Marcus Hook Creek containing a black substance. Further investigation revealed that a 24-inch diameter storm sewer had been broken and repairs were previously conducted in this excavation.

Five non-biased grid samples were collected from Lot 10, one of which (S1006) was added during field excavation of test pit S1004. A white substance was found in the pit and collected for TAL and total organic carbon (TOC) analyses. The remaining non-biased samples were analyzed for asbestos, PCB, VOC and pH. A sixth non-biased grid sample was not collected due to refusal upon encountering a concrete pad. Two biased samples were collected from this lot. A sample of black material (B1001) was collected and submitted for Target Compound List (TCL)/TAL analyses. A second biased sample (B1002) was collected from a 6-inch increment, beneath the black substance, into the underlying soil and submitted for PCB, pH and VOC analyses.

The biased and non-biased sampling that took place on Lot 10 revealed no significant signs of gross contamination. Total volatiles ranged from a low of 0.012 mg/kg in sample B1001 to a high of 0.077 mg/kg in B1002. A total base-neutral analysis of sample B1001 showed a concentration of 29.9 mg/kg. PCB concentrations were found to range from ND in samples S1003, S1004, and S1005 to 2.3 mg/kg in biased sample B1001. Levels of pH on Lot 10 ranged from 5.5 to 7.4 SU. A TOC analysis performed on sample S1006 showed 6,106 mg/kg. Asbestos was ND in all Lot 10 samples analyzed for this parameter. Twenty two metals were detected in both the biased and non-biased samples that were taken on Lot 10. The analytical results are presented on Table 8 and summarized on Figure 25.

5.2.4 Lot 11

Lot 11 contained a portion of the powerhouse cooling water spray ponds and a Quonset Hut used for storage. The spray ponds on this lot are in the same condition as those on Lot 10. Brush covers the remainder of the lot.

Three non-biased and three biased samples were collected on Lot 11, one of which (B1104) was added in the field. After uncovering a cast iron pipe containing black material in test pit S1101, a sample of the pipe's contents were collected and submitted as B1104 for VOC, PCB, and TPH analyses. Another biased sample (B1101) was collected from six inches above the bottom of the spray pond and sampled for VOC and pH. A final biased sample (B1103) was collected in place of sample B1205 of burned surface material and submitted for TCL/TAL analyses. The three

non-biased samples were collected at the depth of the spray pond and were analyzed for asbestos, PCBs, pH and VOCs.

Total volatiles ranged from a low of 0.042 mg/kg in sample S1103 to a high of 2.34 mg/kg in sample B1104. TPH analysis revealed concentrations of 14,100 mg/kg in sample B1104. A total base-neutral analysis performed on biased sample B1103 showed 15.7 mg/kg. Total PCB concentrations ranged from ND to 2.3 mg/kg in sample B1103. Levels of pH on Lot 11 ranged from 4.2 to 8.6 SU. Asbestos was ND in all samples analyzed for this parameter. A total of eighteen metals were detected in biased sample B1103. The analytical results of all sampling performed on this lot are provided on Table 9 and summarized on Figure 26.

5.2.5 Lot 12

Lot 12 formerly contained a cellulose microcrystallization pilot plant, an "anhydrous" sodium sulphate work area, an acid reclaim building, and three sulfuric acid tanks. The pilot plant was used as the Avicel microcrystalline cellulose development area. The "anhydrous" sodium sulphate work area and acid reclaim building were used for evaporation and crystallization operations to recover sodium sulfate and sulfuric acid, respectively. The acid storage tanks contained 93% sulfuric acid. The surface structures have been demolished. Much of the surface is covered with demolition debris, making access to the remaining basements difficult. The pilot plant area has a large mound of fill material covering it. The three acid storage tanks have been removed although their foundations remain in place.

Seven non-biased samples were collected from Lot 12 and analyzed for asbestos, PCBs, TAL, VOCs, and pH. A total of seven biased samples were taken from Lot 12. An initial test pit was excavated adjacent to the former pilot plant, to the depth of the basement floor, to establish the sample depth for the non-biased sampling to be conducted. A biased sample (B1201) was collected from the base of the pit and analyzed for PCBs, pH, VOCs, and TAL. A black material was collected (B1201D) from this test pit, one foot below B1201, and sampled for TOC and TAL. A second test pit was excavated between the acid reclaim and anhydrous sodium sulfate manufacturing areas. This pit exposed an open manway between the two areas. An aqueous sample (B1208) was collected for TCL/TAL analyses. A biased sample (B1202) was collected from a six-inch increment from the bottom of the pit and analyzed for pH, VOCs and

TAL. Another biased sample (B1203) was obtained from the former tank area. The sample was collected from 7 to 8 feet BGS and analyzed for VOCs, PCBs, pH and TAL. A biased sample (B1204) was collected from 0 to 6 inches BGS to characterize the area around the acid reclaim building and analyzed for TCL/TAL. A sample of burned material (B1205) previously identified during a USEPA site reconnaissance could not be located during field operations. A biased sample on Lot 11 was collected in its place. A biased sample (B1207) was taken from 0 to 1 foot BGS under a large debris pile and analyzed for VOCs, PCBs, TAL and TPH. A final biased sample (B1309) was taken from sludge found in a tunnel on Lot 12 and analyzed for TCL/TAL. The tunnel leads from Lot 12 to Lot 13 and was thought to be accessible from Lot 13. For this reason, the original sample designation from the Workplan was maintained.

A total of 14 biased and non-biased samples were collected from Lot 12. Total volatiles ranged from a low of 0.026 mg/kg in biased sample B1309 to a high of 0.218 mg/kg in sample S1203. PCBs were found to range from non-detect to 2.4 mg/kg in sample B1204. A total petroleum hydrocarbon analysis performed on biased sample B1207 showed 2,050 milligrams per kilogram. A total organic compound analysis of biased sample B1201D revealed 928 milligrams per kilogram. Total base-neutrals were found to range from 0.013 mg/kg in B1208 to 22.24 mg/kg in biased sample B1204. Levels of pH ranged from 3.7 to 7.6 SU. Total phenols ranged from non-detected in sample B1208 to 0.11 mg/kg in sample B1204. Asbestos was not detected in any of the samples tested. Twenty three metals were detected in both the biased and non-biased samples that were taken on Lot 12. The analytical results of the sampling performed on this lot are presented on Table 10 and summarized on Figure 27.

5.2.6 Lot 13

Lot 13 contained cooling towers located in a spray pond, an anhydrous sodium sulfate storage and bagging building, and an incinerator building. Water from the cooling towers and spray ponds may have contained treatment chemicals. The cooling towers have been removed. A large amount of debris lies near the former tower location. The incinerator building remains intact and ash was found in or near the building. The spray pond has been filled with demolition debris. There were two transformer carcasses located in the incinerator building. The preliminary assessment of November 8 and 9, 1990 performed for the USEPA reported that the transformers contain PCBs. Demolition debris is scattered across the lot.

Four non-biased samples were collected from Lot 13 and analyzed for asbestos, PCBs, VOC, and pH. A fifth non-biased sample (S1305) was changed to sample S1402 as the sample location fell over the Lot 13/14 border. Eight biased samples were collected from Lot 13. One biased sample (B1302) was collected from 0 to 6 inches BGS next to railroad ties just below ground surface in the front of the incinerator building and analyzed for TAL, PCBs, VOCs and asbestos. A test pit was installed adjacent to the acid reclaim spray pond, and excavated to the depth of the pond. A biased sample (B1303) was collected from a six-inch increment at the bottom of the spray pond, 6 to 6.5 feet BGS, and analyzed for PCBs, pH, VOCs and TAL. A similar test pit was installed adjacent to the former acid reclaim cooling towers. The trench was excavated and a biased sample (B1304) was collected from a six-inch increment at the bottom of the trench and analyzed for pH, VOCs and TAL. A composite sample (B1301) of ash was collected from inside the incinerator building. The ash samples were analyzed for TAL, VOCs, PCBs, pH and asbestos. Asbestos was added to the analyte list based upon field observations.

An additional ash sample (B1306) was collected from the southeast corner of the incinerator building and sampled for VOCs, PCBs, TAL and pH. In addition, transformer carcasses staged in the incinerator building were identified and adjacent soils were sampled (B1305) and analyzed for PCBs. A biased sample (B1307) was taken from sediment in the cooling tower spray pond and analyzed for VOCs, PCBs, and pH. Biased sample B1308 was taken from below a large pile of wooden pallets approximately 60 feet north of the incinerator building. The sample was collected from 0 to 1 foot below the debris pile and analyzed for VOCs, PCBs and TPH.

Total volatiles were found to range from 0.020 mg/kg in sample B1308 to 0.183 mg/kg in sample S1304. PCB concentrations for the two obviously impacted biased samples (B1308 and B1302) were 63 and 60 mg/kg, respectively, while other concentrations ranged from a low of 0.16 mg/kg in sample S1302 to a high of 8.5 mg/kg in sample S1303. A total petroleum hydrocarbon analysis performed on biased sample B1308 showed 2,370 milligrams per kilogram. pH levels ranged from 4.7 to 6.7 SU on the lot. Asbestos was not detected or less than 1% in all samples analyzed. Twenty two metals were detected in the biased samples that were taken on Lot 13. The analytical results of the sampling performed on Lot 13 are provided in Table 11 and summarized on Figure 28.

5.2.7 Lot 14

Aerial photographs indicated that the Lot 14 has been an empty field or storage area. An FMC drawing, dated February 24, 1965, indicates that Lot 14 was used as a coal storage area. Lot 14 has been identified by the USEPA as a potential oil and PCB disposal area. Based upon USEPA suspicions, Lot 14 was heavily sampled through biased sampling in order to allow proper characterization of fill quality. A large mound of what appears to be off-site fill covers the northern portion of Lot 14. The remainder of the lot is level and is scattered with demolition debris including a large pile on the northern portion of the lot just south of the incinerator building located on Lot 13.

Four non-biased and nine biased samples were collected from Lot 14. The non-biased samples were collected and analyzed for asbestos, PCBs, VOCs and pH. An additional non-biased sample (S1404) was added in the field. Four biased samples (B1401, B1402, B1403 and B1404) were collected from the surface, around the perimeter of a mound on Lot 14 and analyzed for TPH. In addition to TPH, sample B1403S was analyzed for TCL, TAL, asbestos, THF, and total lead. A test pit was excavated into the fill mound with a backhoe until undisturbed virgin soil was encountered, and a sample (B1406) was collected from the base of the trench and analyzed for TPH, TCL, TAL, THF and asbestos. A biased sample (B1405) was collected from the fill mound, at a depth of approximately 2 feet BGS, and analyzed for TPH, TCL, TAL, asbestos, and THF. Biased samples (B1407S and B1407D) were taken from the southeast corner of Lot 14 and analyzed for TCL, TAL, TPH, asbestos, THF and total lead. Biased sample (B1408) was taken from the surface below a pile of debris and was sampled for PCB, TAL, TPH, and asbestos. A biased sample (B1409) of black slag was to be collected on Lot 14 for TCL and TAL analysis, however, an identical sample was collected on Lot 15 so this sample was not collected.

Total volatiles on Lot 14 ranged from a low of 0.005 mg/kg in biased sample B1405 to a high of 0.13 mg/kg in sample B1403S. Total base-neutrals revealed concentrations of 0.422 mg/kg in sample B1403S to 9.51 mg/kg in sample B1405. Total PCB concentrations ranged from below the method detection limit to high of 60 mg/kg in sample B1405. Total petroleum hydrocarbons showed concentrations of 478 milligrams per kilogram in sample B1405, as a high, to below the method detection limit. Asbestos analyses performed on biased sample B1405

showed a high of three percent in biased sample B1405 to below the method detection limit. Levels of pH on the lot ranged from 0.70 to 7.1 SU. A total of nineteen metals were detected in the biased samples that were taken from Lot 14. The analytical results of the sampling performed on Lot 14 are provided in Table 12 and summarized on Figure 29.

5.2.8 Lot 15

Lot 15 contained the steeping, and mercerizing processes as well as a lead shop and a cooling tower. Wood pulp, cellulose, and sodium hydroxide were used in the steeping and mercerizing areas. The building, which formerly housed the steeping and mercerizing processes and the lead shop, has been demolished, and the basement areas are clearly visible. The remainder of the lot is scattered with demolition debris.

The original work plan did not call for non-biased sampling to be performed on Lot 15. However, it was concluded through discussions with Dynamac personnel in the field that Lot 15 would be sampled on a non-biased basis. An evenly spaced grid pattern was established for sampling. All non-biased sampling was done at a shallow and deep interval from each test pit. The first three sample locations (S1501S, S1502S and S1503S) were taken from a black coal material and below this material. The shallow samples were collected for TCL, TAL, TPH, THF and total lead. The deep sample for S1501 (S1501D) was collected for the same analytes as the shallow sample with the addition of asbestos. Samples S1502D and S1504D were skipped due to refusal after encountering a concrete pad. Sample S1503D was eliminated due to the lack of a black coal layer. The remaining shallow non-biased samples (S1504S, S1505S, S1506S, S1507S, S1508S, S1509S, S1510S, and S1511S) were collected from 0 to 2 feet BGS for PCBs, TPH, pH, and total lead. The deep samples remaining (S1505D, S1506D, S1507D, S1508D, S1509D, S1510D, and S1511D) were collected from 5 to 11 feet BGS and analyzed for PCB, TPH, pH, and total lead. Two biased samples (B1512 and B1513) were taken from the lot. The B1512 sample was of black slag collected from the surface and analyzed for TCL and TAL. The B1513 sample was of a black stained surface soil, actually on Lot 17, and collected for TCL and TAL. This sample was added due to field observations.

Total volatiles ranged from a low of 0.004 mg/kg in sample S1501D to a high of 0.063 mg/kg in sample S1502S. Total base-neutrals were found to be between 0.43 mg/kg in sample S1501D

and 2.41 mg/kg in sample S1503S. PCBs ranged from below the method detection limit to a high of 87 mg/kg in sample S1504S. Total petroleum hydrocarbon analysis showed a high of 7,900 milligrams per kilogram in sample S1503S to below the method detection limit. Total phenols ranged from below the method detection limit to a high of 1.74 milligrams per kilogram in sample S1503S. pH levels ranged from 3.9 to 10.1 SU on the lot. Nineteen metals were detected in both the biased and non-biased samples that were taken from Lot 15. The analytical results of the sampling performed on Lot 15 are provided in Table 13 and summarized on Figure 30.

5.2.9 Lot 17

The developed portion of the lot contains the churn and mix and pulp storage buildings. Sodium hydroxide tanks were located between buildings 15 and 17. A process unit, thought to be used in the mixing process, was found lying on the surface and stained soils were present in the northeast corner of the lot, near building 17. Carbon disulfide was also used in this area.

The same sampling strategy as used in Lot 15 was also carried out on Lot 17. All non-biased sampling was done at shallow and deep intervals from each test pit. Samples S1701S and S1701D were taken in and below a black coal layer, respectively, and analyzed for TCL, TPH, pH, THF, and total lead. The remaining shallow samples (S1702S, S1703S, S1704S, S1705S, S1706S, S1707S, S1708S, and S1709S) were sampled from 0 to 2 feet BGS and analyzed for PCBs, TPH, and pH. The remaining deep samples (S1703D, S1704D, S1705D, S1706D, S1707D,and S1708D), with the exception of S1702D and S1709D, were sampled from 3.5 to 10 feet BGS and analyzed for PCBs, TPH, pH, and total lead. The S1702D sample was additionally analyzed for VOCs and THF. One biased sample (B1710) of black slag was not collected as it was identical to the slag collected and sampled as B1512 on Lot 15.

The analytical results of the biased and non-biased sampling conducted on Lot 17 are described below. Total volatiles ranged from a low of 0.013 mg/kg in sample S1701D to a high of 0.237 mg/kg in sample S1702D. Total base-neutral analyses showed a low of 0.81 mg/kg in biased sample B1513 to a high of 7.281 mg/kg in sample S1701S. Total PCBs were found to range from a low of less than the detection limit to a high of 400 mg/kg in sample S1703S. Total phenols on biased sample B1513 and S1701S showed 0.14 and 0.13 milligrams per kilogram,

respectively, while sample S1701D was ND. Total petroleum hydrocarbons ranged from below the detection limit to a high of 6,070 milligrams per kilogram in sample S1707S. Total Pb concentrations ranged from 6.4 to 710 mg/kg. Biased sample B1513 was later determined to fallover the lot line and therefore was improperly labeled by field personnel although the sample was taken on Lot 17. Levels of pH on this lot ranged from 4.4 to 10 SU. The analytical results for Lot 17 are provided in Table 14 and summarized on Figure 31.

5.2.10 Lot 20

Lot 20 formerly contained a large portion of the Coating Building, the Solvent Recovery Unit, the Lacquer Mix unit, and the Alcohol Distillation Facility. This complex was used to treat cellophane film with various coatings. During operation, the Coatings Building contained lacquer solids, including polyvinyl chloride, polyvinylidine chloride, and nitrocellulose, along with food grade wax emulsifiers and slip agents. The solvents used in this area included ethanol, ethyl acetate, butyl acetate, tetrahydrofuran, and toluene. The Lacquer Mix area contained the lacquer solids listed above. The Solvent Recovery Unit was used to recover solvents used in the cellophane coating process. Moisture was removed from the solvents using distillation. The buildings have been demolished and the basements appear to have been filled with demolition debris. A storage tank sits on the surface near the demolished areas. Tank foundations are visible in several areas throughout the lot. The Solvent Recovery Unit still exists with demolition debris covering most of the remaining surface of the lot.

Three non-biased and six biased samples were collected from Lot 20. A seventh and eighth biased sample (B2002 and B2006) were going to be collected but were inaccessible due to concrete pads at the sample surface. A deep non-biased sample (S2001D) was taken at the S2001S sample location due to conditions encountered at the time the test pit was excavated and after discussion with Dynamac personnel. The shallow sample (S2001S) was collected for VOCs, TPH, and THF. Sample S2001D was collected for VOCs, SVOA, PCBs, TAL metals, cyanide, TPH, pH and asbestos. The remaining non-biased sample (S2002) was a composite sample collected for VOCs, SVOA, PCBs, TAL, cyanide, pH, and asbestos. One biased sample (B2001) was collected from six inches below a foundation floor approximately 4 feet BGS and sampled for VOCs, PCBs, TAL, cyanide, pH, and asbestos. A biased sample (B2003) was collected from 0 to 6 inches BGS around a transformer on the lot and tested for PCBs. A tan

crust material on an old tank foundation was identified by Dynamac and Roux Associates, Inc. personnel and a sample (B2004) was collected for VOCs, PCBs, pH, and asbestos. The removal of debris was required to collect biased samples B2005S and B2005D. The shallow sample was collected at six inches BGS and the deep sample from approximately four feet BGS. The samples were both analyzed for VOCs, PCBs, TAL, cyanide, and TPH. The final biased sample (B2007) was added after discussion with Dynamac regarding a black stained material located on the lot. The sample was collected and analyzed for VOCs, PCBs, and TPH.

The sampling of Lot 20 was done on both a biased and non-biased basis. Total volatiles were found to range between 0.033 mg/kg in B2004 and 1.323 mg/kg in S2001D. Total base-neutral analysis for sample S2001D showed concentrations of 123.3 mg/kg. Total PCBs ranged from below the detection limit to a high of 430 mg/kg in S2001D. Total petroleum hydrocarbon analysis showed concentrations of 54,900 milligrams per kilogram in sample B2007, as a high, and less than the detection limits, as a low. Asbestos levels ranged from non-detect to as high as 55-65 percent in sample B2004. The obviously impacted sample B2004 was taken from inside a tank pad area in the southeastern portion of the lot. The impacted area was found to be limited to inside the tank pad area although total delineation of the area was not conducted at the time of sampling. Levels of pH ranged from 6.5 to 8.2 SU on this lot. Twenty metals were detected in the biased and non-biased samples that were collected from Lot 20. The results of all analyses are provided on Table 15 and summarized on Figure 32.

5.2.11 Lot 21

Lot 21 also contained sections of the Solvent Recovery Unit, the Lacquer Mix Unit, and the Alcohol Distillation Facility which were found on Lot 20. The visual site inspection revealed no apparent evidence of environmental impact. The surface of the lot is level, with some exposed debris and rocks.

A decision was reached by Roux Associates, Inc. personnel and agreed upon by Dynamac that Lots 21 and 22 would also be set up on a non-biased grid pattern. The 100-foot evenly spaced grid pattern that was utilized made it possible to include two additional samples (S2107 and S2108) on Lot 21. A total of eight non-biased samples were collected from 6 inches BGS and analyzed for VOCs, PCBs, TAL, pH, and asbestos. One biased sample (B2101) was to be

collected from a tank lying on the surface, however, field investigations of the tank revealed that it was empty and a sample was not collected.

The sample results on Lot 21 showed no signs of gross contamination. Total volatiles ranged from a low of 0.045 mg/kg in sample S2101 to a high of 0.176 mg/kg in sample S2105. The results for total PCBs were shown to range from a low of 0.11 mg/kg in sample S2104 to a high of 2.9 mg/kg in sample S1203. Asbestos analyses performed on the samples ranged from a high of three to five percent, in samples S2104 and S2105, to non-detect. Values of pH ranged from 6.9 to 9.1 SU. Twenty metals were detected in the samples that were collected on Lot 21. The analytical results are provided in Table 16 and summarized Figure 33.

5.2.12 Lot 22

Lot 22 formerly held the Solvent and Nitrocellulose Storage Areas. The Solvent Storage area consisted of thirty underground solvent storage tanks including: sixteen 18,000 gallon tanks, six 10,000 gallon tanks, and eight 1,000 gallon tanks. A pipeline carried solvents to the Coating Building for use in coating solutions. The solvents stored were ethyl acetate, butyl acetate, tetrahydrofuran, and toluene. The Nitrocellulose Storage area housed sealed drums of nitrocellulose. A Pennsylvania Department of Environmental Resources (PADER) letter dated May 26, 1988 stated that the underground storage tanks were removed in early 1988. The surface of Lot 22 is level and scattered with debris. The Nitrocellulose Storage building has been removed, and some debris remains. Dismantled pipelines and other debris are visible.

Eleven non-biased and four biased samples were collected from Lot 22. All the non-biased samples (S2201, S2202, S2203S, S2204, S2205, S2207, S2208, S2209, and S2210) with the exception of S2203D were sampled from 0 to 6 inches BGS and analyzed for VOC, PCB, TAL, pH, and asbestos. Non-biased sample S2203D was collected at a depth of 6 to 8 feet BGS and analyzed for VOC, pH, and THF from a exploratory test pit excavated to verify lithology.

Biased samples were collected from 3 to 4 feet BGS (B2201 and B2203, respectively) and 7 to 8 feet BGS (B2202 and B2204, respectively). The shallow biased samples were analyzed for TCL, TAL and THF.

The results of the samples taken on Lot 22, as on Lot 21, showed no signs of gross contamination. Total volatiles were shown to range from a low of 0.039 mg/kg in sample S2210 to a high of 0.142 mg/kg in biased sample B2204. Total base-neutral analyses conducted on biased samples B2202 and B2204 resulted in concentrations of 0.17 and 0.38 mg/kg, respectively. Total PCBs ranged from below the detection limit to 1.6 mg/kg in sample S2201. Total phenols results ranged from below the detection limit to a high of 0.64 milligrams per kilogram in sample B2202. pH levels ranged from 7.3 to 9.0 SU. Asbestos analyses were shown to range from one to two percent in sample S2201 to non-detect. Nineteen metals were detected in the samples that were taken from Lot 22. The results of the analyses are summarized on Table 17 and summarized on Figure 34.

6.0 SURFACE-WATER AND SEDIMENT INVESTIGATION ACTIVITIES AND RESULTS

Subsection 6.1 outlines in detail the surface-water and sediment activities conducted during the performance of this site assessment. Included in this section is the sampling associated with the outfalls from the site boundary into Marcus Hook Creek. The sampling results of the surface water and outfall aqueous and sediment results are described in Subsection 6.2.

6.1 Surface-Water and Outfall Aqueous and Sediment Investigation Activities

This subsection describes the equipment and procedures, health and safety program, equipment decontamination, sample sequence and numbering, and a summary of samples and analytical methods. A full discussion of quality assurance procedures is provided in Section 9.0.

6.1.1 Marcus Hook Creek Surface-Water Sampling Equipment and Methods

Surface-water sampling was conducted at three separate locations along Marcus Hook Creek. The locations are illustrated on Figure 35. One sample was taken at an upstream point from where the creek enters the site's perimeter. Another sample was taken at the confluence of the BP refinery outfall and the creek. A third sample was taken at a downstream point where Marcus Hook Creek leaves the site perimeter.

Roux Associates Inc. personnel used an aluminum rowboat to obtain the surface-water samples from the middle of the creek. Water sampling began at the downstream sampling location and proceeded upstream. Entry to the creek was made down stream from the sampling point to prevent potential contamination of samples by compounds mobilized by the samplers. In addition, samples were also taken from the upstream end of the rowboat to further prohibit possible contamination. The samples were collected by submerging the opened sample containers in the flowing stream. In cases where samples were duplicated for the USEPA, a one quart sample jar was used whereby half the obtained sample was poured in each sample container to ensure even distribution of analytical results between the two samples. When sediment and surface-water samples were collected at the same location the surface-water sample was collected first. To ensure the integrity of the samples, surface-water samples were collected during low tide conditions.

6.1.2 Marcus Hook Sediment Sampling Equipment and Methods

Sediment sampling was also conducted at three locations along the Marcus Hook Creek. These locations are also illustrated on Figure 35, and were selected to be taken at the same locations as the surface-water sample locations described in Section 6.1.1.

Roux Associates Inc. personnel used hip-waders and a rowboat, as described above, to obtain the sediment samples. Sediment sampling began at the downstream sampling location and proceeded upstream. Entry to the creek was made down stream from the initial sampling point to prevent contamination of samples by compounds mobilized by the samplers. In addition, samples were also taken from the upstream end of the rowboat to prohibit possible contamination as described above. The samples were collected by using pre-decontaminated stainless steel hand augers, and pre-packaged, disposable sample spoons were used to transfer the sample into sample containers.

6.1.3 Outfall Aqueous and Sediment Sampling Equipment and Methods

Outfall sediment sampling was also conducted at three separate locations along the Marcus Hook Creek. These locations are illustrated on Figure 35. One aqueous sample was taken from the only active outfall at the time of sampling.

Roux Associates Inc. personnel used hip-waders to obtain the sediment samples from just off the side of the creek at the effluent discharge point from each outfall into the creek. The samples were collected from directly beneath the outfall rather than further out into the creek. The samples were collected by using pre-decontaminated stainless steel hand augers, and pre-packaged, disposable sample spoons were used to transfer the sample into sample containers.

6.1.4 Health and Safety Equipment and Methods

Health and safety equipment and methods utilized are described in the health and safety plan provided in the USEPA-approved Workplan. Sampling was conducted in modified Level D personal protective equipment, including steel-toed shoes, protective boots, disposable latex or nitrile gloves, life jackets, and tyvek suits. As indicated in Section 5.1.3 above, all workers were required to read, sign, and conform to the Roux Associates, Inc. health and safety plan.

6.1.5 Decontamination Equipment and Methods

Decontamination of field equipment was conducted in accordance with Roux Associates, Inc.'s Standard Operating Procedure (SOP) for Decontamination of Field Equipment provided in Attachment 1 of the USEPA-approved Workplan. Sampling equipment decontamination was conducted before and between use of all reusable equipment.

6.1.6 Activity Sequence and Sample Numbering System

A pre-sampling walk-through was conducted with personnel from the USEPA's on-site contractor, Dynamac Corporation, prior to the commencement of surface-water and sediment sampling. During this walk-through, the accessibility and purpose of the USEPA-approved sampling locations proposed in the Workplan were evaluated and confirmed. Also during the walk-through, the outfalls to be sampled were identified and flagged for future sampling.

A total of three outfalls were identified and assigned biased sample identification numbers, as discussed in Section 5.1.5. The three outfalls, B1102, B1206, and B1309 were to be sampled for sediment and, if the outfalls were active, the liquid discharge was to be sampled. Only one outfall, B1102, was active at the time of sampling, and a sample identification of B1102A was assigned to the aqueous sample. A total of three separate surface-water and sediment sampling locations were selected to evaluate the impact of site operations on Marcus Hook Creek. The creek sample numbering system identified the downstream surface-water and sediment samples as C101 and C201, respectively. The confluence surface-water and sediment sampling locations were identified as C103 and C203, respectively. The surface-water and sediment samples of the final sampling location, the upstream point, were identified as C102 and C202, respectively.

6.1.7 Summary of Samples and Analytical Methods

All surface-water and sediment samples (B1102, B1102A, B1206, B1309, C101, C102, C103, C201, C202, and C203) were analyzed for the following TCL/TAL parameters: VOCs, SVOCs, PCBs, TAL metals, cyanide, and phenols. Analytical methods for all sample parameters are discussed in Section 9.0.

6.2 Surface-Water and Sediment Investigation Results

The analytical results of the surface-water and sediment investigation along Marcus Hook Creek have been tabulated and are provided on Table 20. In addition, a summary of the analytical results are shown on Figure 36.

The results of the Marcus Hook Creek surface-water investigation showed no signs of gross contamination. Total VOC concentrations ranged from a low of 11 $\mu g/\ell$ in sample C103, the BP Outfall/Marcus Hook Creek confluence sample location to a high of 2,204 $\mu g/\ell$ in sample C102, the upstream sample location. Total base-neutrals were very low in all three samples ranging from a low of 2 $\mu g/\ell$ in samples C102 and C103 to a high of 3 $\mu g/\ell$ in sample C101, the downstream location. Total PCBs and Total Phenols both measured less than their detection limits of 0.5 and 10 $\mu g/\ell$, respectively.

The results of the Marcus Hook Creek sediment investigation showed total VOC concentrations ranging from a low of 0.032 mg/kg in sample C202, the upstream sample location, to a high of 0.184 mg/kg in sample C201, the downstream sample location. Total base-neutrals ranged from a low of 0.069 mg/kg in sample C201 to a high of 96.5 mg/kg in sample C202. Total PCBs were not measured above their detection limit of 0.020 mg/kg. Total phenols ranged from ND in samples C201 and C203 to a high of 0.30 mg/kg in sample C202.

The results of the outfall investigation conducted along Marcus Hook Creek adjacent to the site also included sediment sampling of three identified outfalls as well as an aqueous sample of one of the three outfalls which was active at the time of sampling. The total volatiles concentrations in sediments ranged from a low of 0.035 mg/kg in sample B1206 to a high of 0.203 mg/kg in outfall sample B1309. Total base-neutral concentrations ranged from a low of 4.1 mg/kg in outfall B1206 to a high of 50.2 mg/kg in outfall B1309. Total PCB concentrations ranged from a low of 0.11 mg/kg in outfalls B1206 and B1309 to a high of 54 mg/kg in outfall B1102. Total phenols ranged from a detectable 0.56 mg/kg in outfall sample B1102 to less than the detectable limit of 0.10 mg/kg in samples B1206 and B1309.

The only active outfall at the time of sampling was sample B1102A. Total volatiles measured 95 $\mu g/\ell$; total base-neutrals measured 154 $\mu g/\ell$; total PCBs measured 1.7 $\mu g/\ell$; and total phenols measured less than the detection limit of .01 $\mu g/\ell$.

7.0 GROUND-WATER INVESTIGATION ACTIVITIES AND RESULTS

Subsection 7.1 outlines in detail the ground-water investigation activities conducted during the performance of this site assessment. The ground-water analytical results are provided in Subsection 7.2.

7.1 Ground-Water Investigation Activities

This section summarizes soil boring, monitoring well installation, well development, well gauging, and ground-water sampling conducted. Also discussed is the well surveying, health and safety, decontamination procedures, sample sequence and numbering, and a summary of samples collected and analytical methods. A full discussion of quality assurance procedures is provided in Section 9.0.

7.1.1 Monitoring Well Installation

A total of 10 monitoring wells make up the site monitoring well network. The locations of these wells are illustrated in Figure 7. Four monitoring wells, B-2 through B-5, were installed under the supervision of Weston in 1990. Weston's Borehole Log forms and original Well Completion Summary forms are provided in Appendix A. Six monitoring wells, MW-1 through MW-6, were installed under the supervision of Roux Associates, Inc. in March 1992 to expand the existing monitoring well network. Geologic Logs and Well Construction Logs for the recently installed monitoring wells are also provided in Appendix A. Well construction details for the 10 site monitoring wells are provided in Table 21.

The monitoring wells installed under the supervision of Weston were installed by Trinity Drilling between August 13 and August 15, 1990. The driller used an auger drilling rig to drill five 6-inch diameter boreholes (B-1 through B-5). Each boring, with the exception of B-1 was drilled a few feet below the horizon where groundwater was encountered and completed as a monitoring well.

The monitoring wells installed under the supervision of Roux Associates, Inc. were installed by A.C. Schultes, Inc. between March 16 and March 24, 1992. The driller used a CME 75 hollow-stem auger drilling rig with an 8¼-inch diameter bit to drill the six boreholes for MW-1 through

MW-6. The augers and sampling equipment were steam-cleaned prior to and between uses. Subsurface sampling during drilling activities is discussed in Section 7.1.2 below.

Each monitoring well was constructed using 4-inch diameter, Schedule 40 PVC casing with flush-threaded joints, a bottom cap, and a male plug. The wells are screened with 10 to 15 feet of 0.20-inch slot PVC screen from the bottom of the well (see Table 21). The annular space surrounding each well screen was gravel-packed with No. 2 gravel to a minimum of 1 foot above the top of the screen. A bentonite seal, 0.5 to 1.5 feet thick, was then placed on top of each gravel pack, and the remaining annular space surrounding each well was sealed with Portland cement. Wells B-2 through B-5, MW-2, and MW-5 were completed with water-tight, locking cap assemblies flush with the ground surface. The remaining wells were completed with above-ground protective casings with locking caps.

Wells were developed immediately following installation to remove fine sediments and ensure good communication between the well and the surrounding aquifer. Monitoring wells B-2 through B-5 were developed by air surging at a rate of less than 1 gallon per minute (gpm). Monitoring wells MW-1 through MW-6 were developed using submersible pumps at less than or equal to 1 gpm for approximately 1 hour.

7.1.2 Soil Boring Sampling Equipment and Methods

This section discusses soil sampling conducted during the drilling of MW-1 through MW-6 which were installed for FMC by Roux Associates, Inc. Soil samples were collected continuously at 2-foot intervals using split-spoon samplers. Samples were in a field notebook by a Roux Associates, Inc. geologist to characterize the subsurface lithology. Site geology, based on observations during drilling, is described in Section 2.3.2. Two of the soil samples from each soil boring were submitted for laboratory analysis. One sample was collected from 0 to 6 inches BGS or below the base of a hard surface, such as asphalt. The other sample was collected from a 6-inch interval above the static water table observed during drilling.

Soil sampling was conducted in accordance with the SOP for Soil Boring and/or Monitoring or Observation Well Drilling, Formation Sampling and Borehole Abandonment in Unconsolidated Formations, provided as an Appendix in Addendum II to the USEPA-approved Workplan.

Samples were retrieved using pre-cleaned 2-inch and 3-inch split spoons. Samples collected for laboratory analysis were transferred to sample containers using pre-cleaned stainless steel spoons.

All samples were collected in laboratory supplied, 250-ml glass jars. Sample jars were labeled with sample identification, project name and number, sampler's initials, date and time the sample was collected, and the analytical method to be performed. Preservation requirements for soil boring samples included ice. Because samples were collected for multiple parameter analysis, the VOC-designated sample (if applicable) was collected first, the semivolatile-designated sample (if applicable) was collected second, and samples designated for all other analyses were then collected. Disposable latex or nitrile gloves were worn throughout sample collection and container handling to avoid cross-contamination.

7.1.3 Ground-Water Sampling Equipment and Methods

The ten site monitoring wells were sampled on April 9 and 10, 1992. Monitoring wells MW-2 and MW-5 were resampled on August 21, 1992 to evaluate an anomalous finding in MW-5. Samples were collected in accordance with Roux Associates, Inc.'s SOP for sampling ground-water monitoring wells provided in the USEPA-approved Workplan.

Ground-water sampling procedures included purging and subsequent sampling of well water via manual hand-bailing or low-flow rate submersible pumping. Well sampling data forms are provided in Appendix C and include complete information on purging and field sampling measurements.

Roux Associates, Inc. personnel collected depth-to-water measurements in all site monitoring wells prior to sampling using an electronic water-level indicator. The water-level indicator was thoroughly cleaned between uses. These data were used to calculate the volume of standing water present in each well.

Three casing volumes were typically purged from each well prior to sampling. Dedicated, pre-cleaned, bottom-loading, Teflon® bailers were used for manual hand-bailing. Bailers were lowered into the well with dedicated, non-absorbent polypropylene cord. Wells MW-1 and MW-

3 were purged using a pre-cleaned, stainless steel, sampling pump with dedicated polyethylene discharge tubing. For low-yielding wells, where 3 well casing volumes were unavailable, wells were purged to near dryness and allowed to partially recover prior to sampling.

The samples were collected in pre-cleaned, laboratory-supplied containers provided by the laboratory. The sample containers filled from each well location included: three (3) 40-milliliter vials, field preserved with hydrochloric acid to pH < 2 for VOCs; two (2) 1-liter amber glass jars for semivolatile organic compounds (SVOCs); two (2) 1-liter amber glass jars for PCBs; two (2) 500-milliliter plastic jars for TAL metals, field preserved with nitric acid to pH < 2; one (1) 1-liter amber glass jar for cyanide, field preserved with sodium hydroxide to pH > 12; and one(1) 500-milliliter plastic jar for phenols, field preserved with sulfuric acid to pH < 2.

Each sample container was labeled by the on-site personnel with the sample designation (monitoring well number), site location and client name, time and date of collection, and the sampler's initials. The sample containers were placed in coolers with ice packs and shipped on the date of collection to the laboratory by Federal Express overnight delivery. Copies of the chain-of-custody forms and the raw laboratory results are provided as stand alone reports, with a table of contents for all raw analytical data found in Appendix D.

7.1.4 Health and Safety Equipment and Methods

Health and safety equipment used throughout the ground-water sampling activities included an OVA 580B organic vapor meter, other backup air-monitoring equipment and personal protective equipment suitable for level D ground-water sampling, as described in the health and safety plan included in the USEPA-approved Workplan. Disposable latex and nitrile gloves were worn at all times during sampling.

7.1.5 Decontamination Equipment and Methods

Decontamination equipment and methods of soil and ground-water sampling equipment are described in the SOP for Decontamination of Field Equipment in Attachment 1 of the USEPA-approved Workplan. All sampling equipment was pre-cleaned prior to its initial use and decontaminated between uses in the field at designated decontamination stations. A non-

phosphate soapy water detergent was used during decontamination. Equipment was decontaminated prior to being transported off site.

7.1.6 Activity Sequence and Sample Numbering System

Soil samples collected during monitoring well installation activities were collected from March 16 through March 24, 1992. The samples were designated by the monitoring well boring number from which it was collected and the number in the order of 2-foot split-spoon samples collected, indicating the approximate depth BGS the sample was taken. For instance, the shallow split-spoon sample from the MW-3 boring was designated MW3SS1. The deep sample collected from the fourth split-spoon in the MW-3 boring at 6 to 8 feet BGS was designated MW3SS4. Deep samples were taken from split-spoons collected just above the observed water table. Samples were collected as described in Section 7.1.2.

A full round of ground-water samples were collected on April 9 and 10, 1992. The samples were labeled with their respective well number. Confirmatory ground-water results collected from MW-2 and MW-5 during the second round (August 21, 1992) were also identified with their respective well number, although their raw data can be distinguished from earlier samples obtained by the date of sampling in each sample package. The samples were collected as described in Section 7.1.3.

7.1.7 Summary of Samples and Analytical Methods

The locations of the monitoring wells which were sampled are shown in Figure 7. The soil samples and ground-water samples collected from these locations were all analyzed for VOCs, SVOCs, PCBs, TAL metals, cyanide, and phenols. Analytical methods for each sample parameter are discussed in Section 9.0.

7.1.8 Surveying

From April 6 to April 10, 1992, the ten monitoring wells were surveyed relative to mean sea level and for precise horizontal locations. The top of the inner casing (excluding the cap), the top of the outer steel protective casing, and ground surface adjacent to the well were surveyed to the nearest hundredth foot (+/- 0.01 foot) by Bob Petralia, a professional surveyor subcontracted by Catania Engineering. Points on top of the steel and PVC casings were marked

for future ground-water elevation measurements. Permanent concrete monuments were also installed and surveyed for precise horizontal control across the site. A copy of the complete site survey is included in Appendix E.

7.1.9 Ground-Water Elevation Measurement

Ground-water levels were collected from site monitoring wells on March 24, April 8, April 9, April 23, June 29, July 30, August 21, and September 23, 1992. Ground-water levels were also measured prior to each ground-water sampling event. Additionally, water-level measurements were obtained prior to the initiation of the tidal influence study. An electronic water-level probe was used to measure the depth to water from the surveyed measuring points in wells during each sampling event. The elevation measurements were converted to values relative to mean sea level. These measurements were subsequently used to calculate ground-water elevations and to determine the direction of ground-water flow. The results of the gauging events performed can be found in Subsection 7.2.3.

7.2 Ground-Water Investigation Results

The analytical results for the aqueous and soil samples collected as part of the ground-water investigation have been tabulated and are summarized on Tables 22 and 23, respectively. In addition, a summary of monitoring well aqueous and soil analytical results are shown on Figure 37. The subsections below discuss the results of the soils sampling conducted during well installation as well as a first round of ground-water sampling. Also detailed below are the results of a second confirmatory sampling episode performed on two wells to evaluate an anomalous analytical result.

7.2.1 Soil Sampling Results

The analytical results from soils collected during well installation showed no signs of gross contamination. Total volatile concentrations ranged from a high of 0.256 mg/kg in sample MW3SS1 to a low of 0.024 mg/kg in sample MW4SS1. Total base neutrals ranged from a high of 12.7 mg/kg in sample MW4SS1 to a low of 0.11 mg/kg in samples MW5SS1 and MW5SS5. Total PCBs ranged from a high of 1.4 mg/kg in MW1SS1 to not detected in samples MW2SS2, MW2SS6, MW3SS4, MW5SS1, and MW5SS5. Total phenols ranged from a high of 4 mg/kg to not detected in ten of the eleven remaining split spoon samples taken during well installation.

7.2.2 Ground-Water Sampling Results

The results of the ground-water investigation showed total volatile concentrations ranging from a high of 53 $\mu g/\ell$ in existing well B-4 to a low of 1 $\mu g/\ell$ in existing well B-3. Total base neutral concentrations ranged from a high of 181 $\mu g/\ell$ in existing well B-5 to a low of 1 $\mu g/\ell$ in wells MW-1, B-2, and B-3. Total PCBs were detected in MW-6 and B-5 at 28 and 0.62 $\mu g/\ell$, respectively. PCBs were not detected in the eight remaining wells. Total phenols measured less than the detectable limit of .01 mg/ℓ in all ten wells.

A second round of confirmatory sampling was performed on August 21, 1992 for volatile organic analysis to verify previous results. The original anomalous finding of concern was 18 $\mu g/\ell$ of carbon disulfide in MW-5, an upgradient well. This compound was not detected during the second round of sampling.

7.2.3 Ground-Water Elevation Measurement Results

The ten on-site monitoring wells were gauged by Roux Associates, Inc. for depth to water on eight occasions prior to the submission of this site assessment. Well monitoring logs for these gauging rounds are provided in Appendix F. Depth to water in the monitoring wells ranged between approximately 1.7 and 13.25 feet below ground surface (BGS). Water-table elevation data collected on March 24, April 8, April 9, April 23, June 29, July 30, August 21, and September 23, 1992 are presented on Table 1 and were used to construct the water-level elevation contour maps presented in Figures 10 through 17, respectively. The water-table elevation data indicate that ground-water at the site flows to the east, towards Marcus Hook Creek.

8.0 ADDITIONAL ASSESSMENT ACTIVITIES AND RESULTS

Several additional assessment activities were conducted as part of the AOC assessment. The methods and results of the magnetic locator survey conducted on Lots 20 through 22 are presented in Subsection 8.1. An evaluation of potential migration pathways is included in Subsection 8.2. The disposal of personal protective equipment and supplies is documented in Subsection 8.3.

8.1 Magnetic Locator Survey

On May 26, 1992, a magnetic locator survey was conducted on Lots 20 through 22. These lots were originally targeted for the survey due to uncertainty at the time of development of the Workplan regarding the status of 30 USTs on Lot 22. Subsequently, documentation of PADER knowledge of removal of these tanks was obtained. The magnetic locator survey was still conducted in an effort to confirm the absence of additional USTs on these lots. Roux Associates, Inc.'s SOPs for conducting magnetic locator surveys was provided in Attachment 1 of the Workplan.

Prior to the survey, a grid covering an area of extending approximately 800 feet by 250 feet was established in the field using surveyor's tape and marking flags. The grid consisted of north-south traverses spaced approximately 10 feet apart on the outside portions of the lots and reduced to five feet in the vicinity of the former tank field(s). The area of the magnetic survey is shown on Figure 3. When a magnetic anomaly was identified, an attempt was made to quantify the size and depth of the object by moving the magnetometer away from the ground surface or decreasing the sensitivity of the instrument.

The surface area of the lots on which the magnetometer survey was conducted was largely covered by demolition debris (i.e. iron rebar, steel scrap, pipes). The area was traversed with the magnetometer at high, medium, and low sensitivities. In all three scenarios, extensive ferromagnetic debris was detected, but no response signals suggested the presence of remaining USTs. While the conditions for conducting a magnetic survey were not optimal, the absence of clear ferromagnetic evidence of USTs and the PADER documentation regarding earlier tank

removal on Lot 22 appears to confirm the absence of any remaining tanks in the solvent storage tank area.

8.2 Migration Pathways

Natural migration pathways which exist at the site include dust migration via air transport, sediment transport via storm water, and ground-water transport. These natural pathways can be supplemented by activities such as construction, storm water collection systems, and preferential flow along subsurface structures or utilities.

8.2.1 Surface Run-off

Natural surface-water runoff will follow topography and serve as a mechanism to mobilize surface soils. The surface runoff from Lots 20 through 22 will be to the west and south via sheet flow. The surface runoff along the eastern border of Lots 8 through 14 will be directly to Marcus Hook Creek via sheet flow. The remainder of the site was historically drained via a storm water collection system. A site plan showing the storm sewer collection system is provided as Plate 1. A total of four discharge points are shown, but only three outfalls were actually located in the field. Outfall aqueous and sediment sampling was conducted as described in Section 6.0. The northernmost discharge point was found to be impacted by PCBs and several base-neutral compounds including trichlorobenzene, a synthetic compound used as a transformer fluid. This discharge point can be traced back to manholes located immediately adjacent to Lot 15. These findings suggest that the stormwater drainage system serves as a migration pathway at the site. Given the findings, direct discharge of constituents of concern to the storm sewer is considered a possibility.

8.2.2 Subsurface Structures and Utilities

Roux Associates, Inc. reviewed over 150 historical drawings and conducted site reconnaissance to evaluate the scope and impact of subsurface structures and utilities at the site. The historical subsurface structures include basements, vaults, tanks, and tunnels, some of which still exist at the site. The exact location, configuration, and depth of these features are not known. The potential impact from these structures would depend on the location of potential source areas with respect to ground-water depth and flow direction.

The historical utilities which existed included storm sewers, sanitary sewers, steam lines, electrical conduits, and certain product conveyance piping. Drawings of the sanitary and storm sewer systems were located and copies are provided as Plate 1. Drawings of the other utility systems were not available, but field observations during excavation activities indicated significant piping in the shallow subsurface. Given the uncertainties associated with historical subsurface structures and utilities, it is believed that the best method to evaluate their impact is broad based downgradient ground-water monitoring as has been conducted at this site. The only obvious exception to this approach is discharge points from the storm water system which was discussed in Subsection 8.2.1.

8.2.3 Geologic Pathways

As concluded in previous assessments, results from the subsurface investigation indicate that the subsurface geologic materials do not offer conditions suitable for high contaminant mobility. Contaminant mobility through unsaturated soil to the water-bearing zone and through the water-bearing zones is reduced by the nature of the soils.

Although heterogeneous, both the fill material and the natural soils contain a significant abundance to majority of clayey silt and silty clay. The low permeability of these materials does not promote flushing of contaminants through the unsaturated zone to the saturated soils. This is evidenced by the comparatively higher concentrations of contaminants in unsaturated subsurface materials, particularly shallow materials, relative to the concentrations of contaminants in saturated soils sampled during drilling operations.

Once in the ground-water, the physical mobility of contaminants is primarily dependent on the ground-water velocity, which is expected to be quite low, considering the low range of hydraulic conductivities of the soils.

Flushing of contaminants through the unsaturated zone is further limited by the activity of the clays. Based on the mineralogy of the parent rock (Wissahickon Schist), the clay mineralogy is likely to be high in illite and kaolinite content. While the activity of illite and kaolinite is typically moderate to low, these clays still have the ability to accept water into their structure

and swell, further decreasing permeability. The ability of the clays to adsorb contaminants onto their charged surfaces is another retarding factor.

8.3 Waste Management Procedures

Personal protective equipment and spent disposable sampling equipment were placed in three 55-gallon drums. The drums were labeled with the source and material, and stored on-site next to an office trailer which was used for field operations. Composite samples were collected from the non-hazardous waste stream for load verification prior to shipment to a permitted waste disposal facility. The licensed waste hauler, Republic Environmental, Inc., transported the three drums for disposal to Waste Conversion, Inc. on October 2, 1992 for landfilling. A copy of the completed manifest is presented in Appendix G.

9.0 DATA QUALITY ASSURANCE

The primary objective of the AOC investigation was to collect defensible, quantitative data for use in characterizing site conditions. The methods employed were designed to meet or exceed all USEPA requirements under the National Contingency Plan (NCP). This discussion will describe the quality assurance/quality control (QA/QC) measures that were performed to meet the objectives of the site assessment. The purpose of the quality assurance program is to ensure that the data obtained from the assessment accurately reflected actual environmental conditions in the area of study. Any deviations from anticipated conditions were noted, and corrective actions were taken, as necessary, to maintain appropriate quality in the sample collection and analysis program.

The following four categories are discussed below: sampling procedures; analytical procedures; data handling; and quality control. This information is intended to supplement other sources of QA/QC procedures or data presented elsewhere in this report.

9.1 Sampling Procedure

After initial set-up and mapping of sample locations, the soil samples were collected as described in the Sample Collection Method and Procedures Plan (Appendix A of the Workplan) and as previously discussed in Sections 5.1, 6.1, and 7.1.

9.1.1 Sample Labeling Procedures

Each individual sample container was labeled prior to sampling with the following information: site name, sample designation, and analysis to be performed. The following information was added after sample collection: time and date of collection. Each sample collected was identified with a unique designation. Proper sample labeling was confirmed at the time of sample collection, prior to sample shipment to the laboratory, and upon receipt by the analytical laboratory.

9.1.2 Sample Collection Bottles

Sample collection bottles were supplied by the laboratory and coordinated to arrive at the site on each sampling day. Laboratory shipping and custody documentation was included with each

shipment to the field. Sample collection bottles provided were visually inspected by field personnel to ensure that they were precleaned.

QC sample containers along with a supply of deionized analyte-free water were also provided by the laboratory. Trip blanks were prepared at the laboratory with laboratory-grade water and accompanied the sample containers to the site and back to the laboratory for analyses. Trip blanks were maintained under chilled conditions with the sample containers at all times.

9.1.3 Preservatives

No preservatives were required for the soil samples except to cool and maintain 4° Celsius with ice. Samples were shipped in ice coolers to maintain the proper temperature. All preservatives needed for the liquid matrix samples were added in the field. The pH was field checked with pH paper prior to being sent to the laboratory, with the exception of the 40 mℓ vials which were preserved with a predetermined amount of hydrochloric acid and checked by the laboratory upon their receipt.

9.1.4 Holding Times

Holding times for the samples ranged from 7 to 28 days, depending upon the analytical method specified. Method specified holding times were adhered to for the soil, liquid, and QC samples.

9.1.5 Custody Procedures

Chain of custody forms were completed for each day of sample collection. The chain of custody form had the following information: site location, sampler name(s), sample designation, date of collection, time of collection, sample matrix type, sampling container size and number, analysis to be performed, preservatives present, and a signature with date and time of each party responsible for custody of the samples. The party with responsibility for the samples maintained custody of the samples throughout the sampling period. A signed and dated custody seal was placed on each sample cooler prior to shipment to the laboratory. The status of the custody seal was noted on the accompanying chain of custody form. Once the samples were received by the laboratory, the in-house custody procedures established by the laboratory were followed.

9.2 Analytical Procedures

The compounds of interest, as specified in the AOC and supplemented by file review, were quantified by the USEPA analytical methods described below. A summary of analytical methods used is provided on Table 24. All of the samples were analyzed by Compu-Chem Laboratories, Inc. located in Chapel Hill, North Carolina.

For the soils samples, the following SW846 methodologies were used. Volatile organic compounds were quantified by USEPA Method 8240+15. Base neutral/acid extractable compounds were quantified by USEPA Method 8270+15. Total petroleum hydrocarbons were quantified by USEPA Method 418.1, as modified for soils. Total organic carbon (TOC) samples were quantified by USEPA Method 9060. Polychlorinated biphenyls (PCBs) were quantified by USEPA Method 8080. Asbestos samples were quantified by the Polarized Light Microscopy (PLM) method. Metals, cyanide, and phenol were quantified by USEPA Methods 7000-7950, 9010, and 9065, respectively.

For liquid matrix samples, the following methodology was used. Volatile organic compounds were quantified by USEPA Method 8240+15. Base neutral/acid extractable compounds were quantified by USEPA Method 8270+15. Total petroleum hydrocarbons were quantified by USEPA Method 418.1. Polychlorinated biphenyls were quantified by USEPA Method 8080. Asbestos samples were quantified by the Transmission Electron Microscopy (TEM) Method. Metals, cyanide, and phenol were quantified by USEPA Methods 7000-7950, 9010, and 9065, respectively.

The laboratory data package included USEPA Contract Laboratory Program (CLP) deliverables and the report included the following elements: title page, field chain of custody, internal laboratory chain of custody, laboratory chronicle, method summary, method references, sample data including analytical reports and raw sample data with instrument print outs, quality control summary (duplicate, matrix spike, matrix spike duplicate, and surrogate forms) including raw initial and continuing calibrations and standardization data with instrument print outs, and raw quality control data including instrument print outs.

Complete copies of the raw analytical data for this project have been bound separately and are not included with this report. Appendix D may be used as a table of contents to locate the analytical report for any sample submitted for laboratory analysis during the AOC investigation.

9.3 Data Handling

The following sections discuss the procedures that were used in data reduction, validation, and reporting. Analytical data were obtained from the laboratory and included: soil and water sampling analytical results, QA/QC results, and laboratory-prepared quality control data.

9.3.1 Data Reduction

Data received from the laboratory were summarized and only the detected compounds were tabulated in order to facilitate review of the results. Volatile and base-neutral extractable compound results were also totaled in order to allow more efficient review of the results. All data received were reported according to accepted practices of quality assurance.

9.3.2 Data Validation and Review

CLP data validation guidelines and reporting values were used during data review. Outliers, values outside the "expected" range of values, were reported along with documentation of the cause of the problem if encountered. Reported values below the method detection limit were qualified with the value "J". Compounds reported in samples and also detected in either the trip, method, or field blanks were qualified with the value "B". Compound concentrations exceeding the calibration for the GC/MS instrument were qualified with the value "E". Non-detected compounds were qualified with the value "U". The value "X" indicated that other footnotes as described in the laboratory report, may have been required to properly define the results.

Data review procedures were consistent with the standard USEPA analytical method chosen and were in accordance with USEPA's document "Laboratory Data Validation - Functional Guidelines for Evaluating Organic Analysis, Hazardous Site Evaluation Division", USEPA, February 1, 1988. Thirty percent of the CLP deliverables data was subcontracted to Ecochem Laboratories by Roux Associates, Inc. for independent validation. The data validation report is included as Appendix H. Roux Associates, Inc. personnel evaluated the non-CLP data by

checking methodology used by the laboratory against that requested. A review of field blank, method blank, and MS/MSD results were performed. In addition, TPH and TOC laboratory calculations were randomly checked by Roux personnel and fiber concentration levels for TEM were reviewed.

9.3.3 Data Reporting

The data collected are arranged in a format that is both clear and logical. The soil and water sample results are presented in tabular form including the QA/QC related sampling results. All of the detected compounds have been listed. Other presentation methods such as contour maps or superimposed analytical results on site sampling location maps have been used. Reporting was accomplished in a manner consistent with published Comprehensive Environmental Response Compensation and Liability Act (CERCLA) investigation guidance documents.

9.4 Quality Control

Quality control (QC) measures were implemented to help ensure that Quality Assurance was maintained throughout sample collection and analysis. A primary goal of QC was to monitor and document the quality of data gathered.

9.4.1 Internal QC Checks

Internal QC checks involved the documentation of the calibration of field equipment. Field calibration equipment including calibration gas, regulator, and connect tubing were maintained with the Photo-Ionization Detector (PID). The PID was calibrated at the beginning of each sampling day. Field equipment requirements and procedures are detailed in the Sample Collection Methods and Procedures Plan (Appendix A of the Workplan). This plan was followed during all sample collection, with departures documented in the field notebook. This method allowed accurate documentation of field activities.

9.4.2 QC Samples

The three types of QC samples utilized during the sampling plan implementation were: sample duplicates, trip blanks, and equipment field blanks. One duplicate sample was obtained for approximately every 20 samples collected. One trip blank and one equipment blank were obtained for each calendar day of sampling. The trip blank was analyzed for volatile organic

compounds only. The field equipment blank was analyzed for the entire list of compounds being evaluated for the samples collected on that day.

Duplicate samples were collected from the same sample location. Duplicate samples were identified as duplicates without identifying the sample location. Results obtained from duplicate samples were used to evaluate laboratory precision. Analytical parameters requested were the same as for the sample from which the duplicate had been taken.

Trip blanks consisted of a 40-ml VOC vial filled with laboratory water which originated with the sample container shuttle at the laboratory. Trip blanks accompanied the sample containers into the field from shipment from the laboratory, during sampling and back to the laboratory. The trip blank was analyzed for volatile organic compounds (VOCs) only.

Equipment field blanks were collected by pouring laboratory supplied water over or through sampling tools and collecting the rinsate into a sample container with preservative. The equipment blank was analyzed for the same parameters for which that day's field samples were evaluated.

9.4.3 Performance and System Audits

The planned QC samples were the primary indicator of sampling and laboratory performance. The duplicate samples were not identified to the laboratory allowing an additional audit of the laboratory's performance. The equipment blank allowed for the evaluation of the effectiveness of sampling equipment decontamination procedures.

9.4.4 Preventive Maintenance

Field equipment was maintained in good working order as part of Roux Associates, Inc.'s standard operating procedures. The PID used was factory calibrated within the last year.

9.4.5 Data Measurement Assessment Procedures

The quality of data obtained was dependent upon two separate factors, field-related sample collection and shipment, and laboratory procedures. Laboratory procedures and their affect on the data was assessed during data validation procedures. The field-related factors were assessed

by the review of the sampling field notebook, equipment calibration forms, daily report logs, yand procedure anomaly documentation.

9.4.6 Corrective Action Planning

Due to the duration of sample collection activities, field-related quality assurance problems were addressed as encountered. Advance planning of activities helped eliminate problems prior to their impacting the investigation data quality. Laboratory-related quality assurance issues were researched and addressed as appropriate. Every effort was made to anticipate and eliminate potential problems before they arose by careful preparation and planning.

9.4.7 QC Report to Management

Quality Control reports are either field or laboratory related. The laboratory reporting package includes a Quality Control write up of conditions which may have influenced the data reported. The field activities were documented in the field book and daily activity log.

9.4.8 Conclusions

The data collected were adequate to meet the objectives of the AOC site assessment. Based on internal and external review, it is concluded that the data obtained from the assessment accurately reflects actual environmental conditions at the site.

10.0 FINDINGS AND CONCLUSIONS

The findings and conclusions are based on review of historical drawings, aerial photographs, employee interviews, regulatory file review, previous environmental assessment findings, published and unpublished hydrogeologic reports, and extensive on-site soil and aqueous sampling and analysis. The general statements presented below are supported by the information included in this report.

- Historical manufacturing operations were similar from the early 1900s until FMC shut down operations in 1975. The identity and storage locations of raw materials, products, and wastes for viscose and support operations are well defined during active manufacturing operations.

- Based on review of historical manufacturing operations, the major raw materials included cellulose, acids, bases, carbon disulfide, lacquer solids, solvents, and fuel oils. The major raw material storage and handling locations were effectively targeted during the assessment and the analytical parameters selected were appropriate for the constituents of concern.

- As a result of improper demolition conducted by others, land disposal of construction debris, asbestos materials and PCB transformer oils has occurred. These activities may have been localized at first, but poor documentation and subsequent development activities appear to have complicated matters by scattering of materials during grading of the site.

- Although the demolition activities were unrelated to FMC operations, the assessment also included identification and delineation of PCBs, asbestos, and demolition material.

- The site assessment activities conducted for FMC were sufficient to broadly characterize the soil conditions for the areas investigated. The analytical results from 148 soil samples and the visual observations from the associated test pit excavations confirm the absence of gross or widespread contamination in surface and subsurface soils.

- The soil findings can be summarized as follow: VOCs were detected in all 108 soil samples collected, but only two exceeded total concentrations of 1 ppm; base-neutral compounds were detected in 30 of 33 samples, with only seven exceeding 5 ppm, typically these were biased samples of oil stained material; PCBs were detected in 81 of 113 samples, with only 14 exceeding 5 ppm, most of which were surface samples on Lots 13, 15, and 17; TPH was detected in 38 of 59 samples, only 4 of which exceeded 10 ppm, many of which were related to obvious oil stained surface material; pH conditions were normal (6-9 SU) across the site with several minor exceptions; only 10 of 62 samples exceeded 1% asbestos, with the highest concentrations detected in suspected asbestos materials; with a few minor exceptions, metals concentrations were within expected ranges for site conditions.

- Localized "hot spot" surface and subsurface soil impact was observed in several areas, including TPH near the fuel oil tank on Lot 9, asbestos in a suspected burial area on Lot 9, and PCBs on Lots 13, 14, 15, and 17. Low level PCB and asbestos levels were observed in surface and subsurface soil throughout the area of investigation.

- The shallow subsurface soils and fill material consist of silty clay or clayey silt which overlie weathered schist bedrock. The vertical migration through this unconsolidated material is expected to be limited. Ground water beneath the site flows to the east, with discharge to Marcus Hook Creek.

- The ground-water conditions beneath the site were examined by analyzing samples from 10 on-site monitoring wells. The analytical results and observations during well installation and sampling confirm the absence of any significant contamination of ground-water beneath the site due to historical operations.

- Localized PCB impact to ground-water at a maximum concentration of 28 $\mu g/\ell$ was observed in the area immediately downgradient of Lot 15.

- Aqueous and sediment samples collected from Marcus Hook Creek indicate the presence of VOCs and base neutrals, and the absence of PCBs. The upgradient sample of both

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[5]FMC Corporation (Pellissier, R.L.), 1992. Addendum II to the Work Plan for Investigation of Soil and Ground Water of a Portion of the East Tenth Street Site, Marcus Hook, Pennsylvania in Letter to William Steuteville, On-Scene Coordinator, USEPA Region III, dated January 8, 1992.

[6]Greenman, D.W., Rima, D.R., Lockwood, W.N., and Meisher, H., 1961. Ground-Water Resources in the Coastal Plain of Southeastern Pennsylvania. PA Geological Survey (Topographic and Geologic Survey), Fourth Series, Bulletin W-13.

[7]Hall, G.M., 1973 (1934). Ground Water in Southeastern Pennsylvania. Commonwealth of Pennsylvania Department of Environmental Resources' Bureau of Topographic and Geologic Survey. Bulletin: Water Resources Report, W-2.

[8]Owens, J.P. and Minard, J.P., 1979. Upper Cenozoic Sediments of the Lower Delaware Valley and the Northern Delmarva Peninsula. New Jersey, Pennsylvania, Delaware, and Maryland. USGS Professional Paper. 1067-D.

[9]Soil Conservation Service, U.S. Department of Agriculture, 1963. Soil Survey of Chester and Delaware Counties, Pennsylvania, Sheets 66-67.

[10]National Oceanic and Atmospheric Administration, National Ocean Service, U.S. Department of Commerce, 1987. Delaware River and Bay Tidal Circulation and Water Level Forecast. Atlas.

[11]NTH Consultants, Ltd. 1990. Environmental Site Assessment for FMC Tank Farm, Marcus Hook, Pennsylvania. NTH Consultants, Ltd., Exton, Pennsylvania.

[12]Roy F. Weston, Inc., 1990. Marcus Hook Business and Commerce Center Environmental Assessment. Roy F. Weston, West Chester, Pennsylvania.

TABLES

Table 1. Water-Level Elevations for March 24, April 8, April 9, April 23, June 29, July 30, and August [illegible]
FMC Corporation; Marcus Hook, Pennsylvania.

ORIGINAL (Red)

Date	Well Number	Casing Elevation[1]	Depth to Water[2]	Depth to Product	Product Thickness	Corrected Water-Table Elevation[1]
March 24, 1992	MW-1	22.03	12.60	--	--	9.43
	MW-2	16.78	1.70	--	--	15.08
	MW-3	18.28	7.55	--	--	10.73
	MW-4	29.40	NG	--	--	NG
	MW-5	31.98	7.41	--	--	24.57
	MW-6	24.10	9.35	--	--	14.75
	B-2	19.83	12.05	--	--	7.78
	B-3	20.86	10.15	--	--	10.71
	B-4	23.51	9.08	--	--	14.43
	B-5	23.01	9.10	--	--	13.91
April 8, 1992	MW-1	22.03	12.52	--	--	9.51
	MW-2	16.78	1.70	--	--	15.08
	MW-3	18.28	8.03	--	--	10.25
	MW-4	29.40	5.67	--	--	23.73
	MW-5	31.98	7.53	--	--	24.45
	MW-6	24.10	10.27	--	--	13.83
	B-2	19.83	NG	--	--	NG
	B-3	20.86	9.99	--	--	10.87
	B-4	23.51	9.10	--	--	14.41
	B-5	23.01	9.49	--	--	13.52
April 9, 1992	MW-1	22.03	12.57	--	--	9.46
	MW-2	16.78	1.70	--	--	15.08
	MW-3	18.28	8.06	--	--	10.22
	MW-4	29.40	7.84	--	--	21.56
	MW-5	31.98	7.67	--	--	24.31
	MW-6	24.10	10.45	--	--	13.65
	B-2	19.83	11.90	--	--	7.93
	B-3	20.86	10.07	--	--	10.79
	B-4	23.51	9.30	--	--	14.21
	B-5	23.01	9.60	--	--	13.41
April 23, 1992	MW-1	22.03	13.03	--	--	9.00
	MW-2	16.78	1.77	--	--	15.01
	MW-3	18.28	8.30	--	--	9.98
	MW-4	29.40	5.72	--	--	23.68
	MW-5	31.98	7.92	--	--	24.06
	MW-6	24.10	11.15	--	--	12.95
	B-2	19.83	12.30	--	--	7.53
	B-3	20.86	10.67	--	--	10.19
	B-4	23.51	9.60	--	--	13.91
	B-5	23.01	10.10	--	--	12.91

Measurements recorded in feet.
[1]Relative to a common datum.
[2]Below established casing elevation measuring point.
-- = Not applicable.
NG = Not gauged.

Table 1. Water-Level Elevations for March 24, April 8, April 9, April 23, June 29, July 30, and August 21, 1992. *FMC Corporation; Marcus Hook, Pennsylvania.*

Date	Well Number	Casing Elevation[1]	Depth to Water[2]	Depth to Product	Product Thickness	Corrected Water-Table Elevation[1]
June 29, 1992	MW-1	22.03	13.25	--	--	8.78
	MW-2	16.78	2.07	--	--	14.71
	MW-3	18.28	8.33	--	--	9.96
	MW-4	29.40	5.79	--	--	23.61
	MW-5	31.98	7.78	--	--	24.20
	MW-6	24.10	11.22	--	--	12.88
	B-2	19.83	NG	--	--	NG
	B-3	20.86	NG	--	--	NG
	B-4	23.51	NG	--	--	NG
	B-5	23.01	NG	--	--	NG
July 30, 1992	MW-1	22.03	NG	--	--	NG
	MW-2	16.78	3.62	--	--	13.16
	MW-3	18.28	8.57	--	--	9.71
	MW-4	29.40	5.95	--	--	23.45
	MW-5	31.98	8.12	--	--	23.86
	MW-6	24.10	11.45	--	--	12.65
	B-2	19.83	12.97	--	--	6.86
	B-3	20.86	11.44	--	--	9.42
	B-4	23.51	6.15	--	--	17.36
	B-5	23.01	9.74	--	--	13.27
August 21, 1992	MW-1	22.03	NG	--	--	NG
	MW-2	16.78	3.30	--	--	13.48
	MW-3	18.28	8.23	--	--	10.05
	MW-4	29.40	5.34	--	--	24.06
	MW-5	31.98	7.72	--	--	24.26
	MW-6	24.10	11.92	--	--	12.18
	B-2	19.83	12.96	--	--	6.87
	B-3	20.86	11.39	--	--	9.47
	B-4	23.51	8.56	--	--	14.95
	B-5	23.01	9.23	--	--	13.78

Measurements recorded in feet.
[1]Relative to a common datum.
[2]Below established casing elevation measuring point.
-- = Not applicable.
NG = Not gauged.

ORIGINAL
(Red)

Table 2. Summary of File Search Sources. FMC Corporation; Marcus Hook, Pennsylvania.

	Name	Location	Phone	Contact Name
1.	Marcus Hook Borough	Marcus Hook, PA	215-485-1341	Bruce Dorbian
2.	PADER Bureau of Topographic and Geologic Survey	Harrisburg, PA	717-787-5828	Donna Snyder
3.	PADER Records Management Department	Conshohocken, PA	215-787-6239	Cynthia Watson
4.	PADER Bureau of Water and Waste Management	Conshohocken, PA	215-832-6130	Joseph Feola
5.	PADER Department of Hazardous Sites and Superfund Enforcement	Conshohocken, PA	215-832-6212	George Dangliw
6.	U.S.G.S. Regional Bureau	Middletown, PA	717-730-6900	Al Becher
7.	Winitsky Associates	Conshocken, PA	215-886-2320	Leon Winitsky
8.	Delaware County Regional Water Quality Control Authority (DELCORA)	Chester, PA	215-876-5523	Mike Freedman
9.	Marcus Hook Construction Office	Marcus Hook, PA	215-485-8361	Ed Corse
10.	Marcus Hook Public Library	Marcus Hook, PA	215-485-6519	
11.	U.S. Department of Labor Occupational Safety and Health Administration	Philadelphia, PA	215-597-4955	Eduardas J. Skladaitis

Table 3. Summary of Previous Site Environmental Investigations. FMC; Marcus Hook, Pennsylvania.

Dates	Description of Activities	Report/Deliverable Generated	Submitted By	Submitted To
4/6/79	Asbestos survey of FMC facility in response to complaints.	Memo: Chronology of Events	PADER	PADER
9/20/79	On-site Asbestos landfill ordered closed.	Memo: Chronology of Events	PADER	PADER
10/29/82	Assessment of liquid waste treatment facility		WESTON	BFI
4/19/82	Order for on-site asbestos to be removed to a landfill.	Memo: Chronology of Events	PADER	PADER
12/14/83	6 samples of suspected asbestos material collected near property line; all samples contained one or more asbestos materials.			
1984	Investigation of complaints regarding asbestos found on plant grounds; sample taken confirms asbestos identification; no further action.	Report: Marcus Hook Business and Commerce Center Environmental Assessment	WESTON	Huggler & Silverang/Bell Saving & Loan
1985	Site/ownership Historical Investigation of former FMC property; engineering analysis of building construction and conditions and usability; observations of...	Engineering Evaluation and Analysis of Structures and Site at the Former FMC property	Pennoni	
1986	Site/ownership history and process descriptions; site visit, observations, conclusions.	Preliminary Assessment for FMC Corporation Marcus Hook Plant, PA #971	PADER	PADER
1987	Preliminary review and visual inspection of MHPI to identify solid waste management units and other areas of concern and to collect information in unit description, period of operation, waste managed, *release controls and history of releases.*	Report: Modified Phase I Report Marcus Hook Processing Incorporated, Marcus Hook Pennsylvania	A.T.Kearny, Inc.	USEPA

ATSDR	Agency for Toxic Substance and Disease Registry	PADER	Pennsylvania Department of Environmental Resources
EHRT	Environmental Health Research and Testing, Inc.	WESTON	Roy F. Weston, Inc.
USEPA	United States Environmental Protection Agency	BFI	Browning Ferris Industries
NUS	NUS Corporation	PRP	Potentially Responsible Party(ies)
Pennoni	Pennoni Associates, Inc. Consulting Engineers	MHBCC	Marcus Hook Business and Commerce Center
MHDA	Marcus Hook Development Authority	Marchuk	President of Strath Haven Realty, a Partner with MHBCC
MHPI	Marcus Hook Processing, Inc.		

Table 3. Summary of Previous Site Environmental Investigations. FMC; Marcus Hook, Pennsylvania.

Dates	Description of Activities	Report/Deliverable Generated	Submitted By	Submitted To
1988	Site Reconnaissance	Preliminary Assessment for FMC Corporation Marcus Hook Plant, PA #971	NUS	USEPA
4/88	Site inspection of underground solvent storage tank farm; including soil and water sampling; illegal waste disposal methods and contamination confirmed.	Letter Regarding Site Investigation of Solvent Storage and Subsequent Disposal Activities/Concerns	PADER	Marchuk, MHBCC
1990	Preliminary assessment including map/file review; communication with federal, state, and local agencies; and review of previous analytical results of contents of underground storage tanks - all regarding tank farm area, lot 23.	Report: Environmental Site Assessment for Tank Farm Marcus Hook, Pennsylvania	NTH	MHDA/Samuel Warner & Sons, Inc.
2/19/90 4/4/90	Site visit and surface/potential source observations of Lot 23; and electromagnetic scan of using terrain conductivity meter; excavation of 17 test pits surrounding former tank area; soil gas survey; field testing of shallow ground water encountered for pH temperature and conductivity; collection of the 14 soil samples and 1 perched water sample for laboratory analysis of volatile organic compound, metals, and total petroleum hydrocarbon content	Report: Environmental Site Assessment for Tank Farm Marcus Hook, Pennsylvania	NTH	MHDA/Samuel Warner & Sons, Inc.
6/90-10/90	Phase I site investigation including non-field site history reconnaissance and site walk-through.	Report: Marcus Hook Business and Commerce Center Environmental Assessment	WESTON	Huggler & Silverang/Bell Savings & Loan

ATSDR	Agency for Toxic Substance and Disease Registry	PADER	Pennsylvania Department of Environmental Resources
EHRT	Environmental Health Research and Testing, Inc.	WESTON	Roy F. Weston, Inc.
USEPA	United States Environmental Protection Agency	BFI	Browning Ferris Industries
NUS	NUS Corporation	PRP	Potentially Responsible Party(ies)
Pennoni	Pennoni Associates, Inc. Consulting Engineers	MHBCC	Marcus Hook Business and Commerce Center
MHDA	Marcus Hook Development Authority	Marchuk	President of Strath Haven Realty, a Partner with MHBCC
MHPI	Marcus Hook Processing, Inc.		

Table 3. Summary of Previous Site Environmental Investigations. FMC; Marcus Hook, Pennsylvania.

Dates	Description of Activities	Report/Deliverable Generated	Submitted By	Submitted To
8/90	Phase II site investigation, including: Drilling of 5 soil borings; installation of 4 ground water wells; excavation of 11 test pits; soil sampling; ground-water sampling.	Report: Marcus Hook Business and Commerce Center Environmental Assessment	WESTON	Huggler & Silverang/Bell Savings & Loan
11/1/90	Sampling of drums in basement of Building 3.	AOC	USEPA	PRP
11/8-11/9/90	Emergency site assessment, including discovery of PCB and asbestos contamination.	AOC	USEPA	PRP
11/13/90	ATSDR investigated health risk to children and workers at site; determined that asbestos represents immediated health risk	AOC	USEPA	PRP
11/90-12/90	Removal assessment by sampling; history and current condition of lots 21-23	Report: Preliminary Assessment Report		EPA
10/91	Investigation of MHPI facility permits and spill incidents	Report: RCRA Facility Investigation Task 1	McClaren/Hart	MHPI
10/91	Identification of potential corrective measure technologies for use in the containment, treatment, remediation and/or disposal of known contamination at the site.	Report: RCRA Facility Investigation Task II, Pre-registration Evaluation of Corrective Measures Technologies	McClaren/Hart	MHPI
1991-92	General RCRA Facility Investigation	Report: RCRA Facility Investigation	McClaren/Hart	MHPI
8/88	Soil above (?) tank farm was removed (how about sampled?); tanks stuck ? and sampled by USEPA Method 601+602	Letter summarizing activities	Cassar Technical Services, Inc.	PADER

ATSDR	Agency for Toxic Substance and Disease Registry
EHRT	Environmental Health Research and Testing, Inc.
USEPA	United States Environmental Protection Agency
NUS	NUS Corporation
Pennoni	Pennoni Associates, Inc. Consulting Engineers
MHDA	Marcus Hook Development Authority
MHPI	Marcus Hook Processing, Inc.
PADER	Pennsylvania Department of Environmental Resources
WESTON	Roy F. Weston, Inc.
BFI	Browning Ferris Industries
PRP	Potentially Responsible Party(ies)
MHBCC	Marcus Hook Business and Commerce Center
Marchuk	President of Strath Haven Realty, a Partner with MHBCC

Table 4. Summary of Biased and Non-Biased Samples/Analytes. FMC Corporation; Marcus Hook, Pennsylvania.

Sample ID	Location	Matrix	Sample Depth	Analytes	Comments
B0801	Lot 8	S	.5-1 BGS	VOC, PCB, pH, Asbestos	
B0802	Lot 8	S	0-.5 BGS	VOC, PCB, TPH, Asbestos	Silt/sand runoff
S0901	Lot 9	S	0-3 BGS	VOC, PCB, TAL, pH, Asbestos	
S0902	Lot 9	S	5-6 BGS	VOC, PCB, TAL, pH, Asbestos	
S0903	Lot 9	S	.5-2.5 BGS	VOC, PCB, TAL, pH, Asbestos	
S0904	Lot 9	S	0-3 BGS	VOC, PCB, TAL, pH, Asbestos	
S0905	Lot 9	S	4-6 BGS	VOC, PCB, TAL, pH, Asbestos	
S0906	Lot 9	S	1-2 BGS	VOC, PCB, TAL, pH, Asbestos, TPH	TPH added in field
S0907	Lot 9	S	NS	Asbestos, PCB, VOC, pH, TAL	Skipped due to refusal - hit concrete pad
B0901	Lot 9	S	0-.5 BGS	VOC, PCB, TPH, Asbestos	
B0902	Lot 9	S	0-.5 BGS	Asbestos	
B0903	Lot 9	S	11-11.5 BGS	VOC, PCB, TAL, TPH	
S1001	Lot 10	S	3-8 BGS	VOC, PCB, pH, Asbestos	
S1002	Lot 10	S	NS	VOC, PCB, pH, Asbestos	Skipped due to refusal - hit concrete pad
S1003	Lot 10	S	3-8 BGS	VOC, PCB, pH, Asbestos	
S1004	Lot 10	S	7-8 BGS	VOC, PCB, pH, Asbestos	
S1005	Lot 10	S	9.5-11 BGS	VOC, PCB, pH, Asbestos	Sample added in field
S1006	Lot 10	S	6-6.5 BGS	TAL, TOC	White substance added in field from S1004
B1001	Lot 10	S	3-4 BGS	TCL/TAL	Black substance in existing excavation

All measurements are shown in feet.
NS = Not sampled.

Table 4. Summary of Biased and Non-Biased Samples/Analytes. FMC Corporation; Marcus Hook, Pennsylvania.

Sample ID	Location	Matrix	Sample Depth	Analytes	Comments
B1002	Lot 10	S	7.5-8 BGS	VOC, PCB, pH	From zone beneath black substance
S1101	Lot 11	S	7-8 BGS	VOC, PCB, pH, Asbestos	
S1102	Lot 11	S	8.5-9 BGS	VOC, PCB, pH, Asbestos	
S1103	Lot 11	S	8-9 BGS	VOC, PCB, pH, Asbestos	
B1101	Lot 11	S	2.5-3 BGS	VOC, pH	
B1103	Lot 11	S	0-.5 BGS	TCL/TAL	Grab/Surface sample added in field in place of B1205 which could not be located
B1104	Lot 11	S	4.5-5 BGS	VOC, PCB, TPH	Sample added in field from cast iron pipe found in S1101
S1201	Lot 12	S	9.5-10-.5 BGS	VOC, PCB, TAL, pH, Asbestos	
S1202	Lot 12	S	10-11 BGS	VOC, PCB, TAL, pH, Asbestos	
S1203	Lot 12	S	11-11.5 BGS	VOC, PCB, TAL, pH, Asbestos	
S1204	Lot 12	S	11-11.5 BGS	VOC, PCB, TAL, pH, Asbestos	
S1205	Lot 12	S	8.5-11.5 BGS	VOC, PCB, TAL, pH, Asbestos	
S1206	Lot 12	S	7-8 BGS	VOC, PCB, TAL, pH, Asbestos	
S1207	Lot 12	S	9-9.5 BGS	VOC, PCB, TAL, pH, Asbestos	
B1201	Lot 12	S	9-9.5 BGS	VOC, PCB, TAL, pH	
B1201D	Lot 12	S	10.5-11.5 BGS	TOC, TAL	Sample for unknown black viscose-like material added in field from TPB1201
B1202	Lot 12	S	2.5-3.5 BGS	VOC, PCB, TAL, pH	
B1203	Lot 12	S	7-8 BGS	VOC, TAL, pH	

All measurements are shown in feet.
NS = Not sampled.

Table 4. Summary of Biased and Non-Biased Samples/Analytes. FMC Corporation; Marcus Hook, Pennsylvania.

Sample ID	Location	Matrix	Sample Depth	Analytes	Comments
B1204	Lot 12	S	0-.5 BGS	TCL/TAL	
B1205	Lot 12	S	NS	TCL/TAL	Burned material skipped - unable to locate
B1207	Lot 12	S	0-1 BGS	VOC, PCB, TAL, TPH	
B1208	Lot 12	W	9 BGS	TCL/TAL	Sample added in field below debris pile. Aqueous sample taken from open manhole under B1202
S1301	Lot 13	S	4-6 BGS	VOC, PCB, pH, Asbestos	
S1302	Lot 13	S	9-11 BGS	VOC, PCB, pH, Asbestos	
S1303	Lot 13	S	5-7 BGS	VOC, PCB, pH, Asbestos	
S1304	Lot 13	S	4.5-6.5 BGS	VOC, PCB, pH, Asbestos	
S1305	Lot 13	S	NS	VOC, PCB, pH, Asbestos	Skipped - sample ID changed to S1402 as sample location fell over lot line
B1301	Lot 13	S	0-.5 BGS	VOC, PCB, TAL, pH, Asbestos	Asbestos added in field to ash sample
B1302	Lot 13	S	0-.5 BGS	VOC, PCB, TAL, Asbestos	
B1303	Lot 13	S	6-6.5 BGS	VOC, PCB, TAL, pH	
B1304	Lot 13	S	6-7 BGS	VOC, TAL, pH	
B1305	Lot 13	S	0-.5 BGS	PCB	
B1306	Lot 13	S	0-.5 BGS	VOC, PCB, TAL, pH	Ash
B1307	Lot 13	S	6-7 BGS	VOC, PCB, pH	
B1308	Lot 13	S	0-1 BGS	VOC, PCB, TPH	Below debris pile
B1309	Lot 12/13	S	10 BGS	TCL/TAL	Grab sample taken in tunnel on lot 12

All measurements are shown in feet.
NS = Not sampled.

Table 4. Summary of Biased and Non-Biased Samples/Analytes. FMC Corporation; Marcus Hook, Pennsylvania.

Sample ID	Location	Matrix	Sample Depth	Analytes	Comments
S1401	Lot 14	S	0-.5 BGS	VOC, PCB, pH, Asbestos	
S1402	Lot 14	S	6-7 BGS	VOC, PCB, pH, Asbestos	
S1403	Lot 14	S	0-1 BGS	PCB, pH, Asbestos, VOC	
S1404	Lot 14	S	8.5-11.5 BGS	VOC, PCB, pH, Asbestos	S1404 was added in field
B1401	Lot 14	S	0-.5 BGS	TPH	Surface sample
B1402	Lot 14	S	0-.5 BGS	TPH	Surface sample
B1403S	Lot 14	S	.5-1 BGS	TCL/TAL, TPH, Asbestos, THF, Pb	Surface sample
B1403D	Lot 14	S	NS	TCL/TAL, TPH, Asbestos, THF, Pb	Skipped[1]
B1404	Lot 14	S	0-.5 BGS	TPH	Surface sample
B1405	Lot 14	S	1.5-2 BGS	TCL/TAL, TPH, Asbestos, THF	
B1406	Lot 14	S	3.5-5.5 BGS	TCL/TAL, TPH, Asbestos, THF	
B1407S	Lot 14	S	1-3 BGS	TCL/TAL, TPH, Asbestos, THF, Pb	
B1407D	Lot 14	S	10-12 BGS	TCL/TAL, TPH, Asbestos, THF, Pb	
B1408	Lot 14	S	0-1 BGS	PCB, TAL, TPH, Asbestos	Sample was taken below debris pile
B1409	Lot 14	S	NS	TCL/TAL	Skipped - sample was taken as B1512
S1501S	Lot 15	S	7-8 BGS	TCL/TAL, TPH, THF, Pb, Ph	
S1501D	Lot 15	S	11-11.5 BGS	TCL/TAL, TPH, Asbestos, THF, Pb	
S1502S	Lot 15	S	9-10 BGS	TCL/TAL, TPH, THF, Pb, Ph	
S1502D	Lot 15	S	NS	TCL, THF, Pb, pH, TPH	Skipped - hit concrete pad

[1]Historical grade sample was not taken since historical and present grade were one in the same at this location.
All measurements are shown in feet.
NS = Not sampled.

ORIGINAL (Red)

Table 4. Summary of Biased and Non-Biased Samples/Analytes. FMC Corporation; Marcus Hook, Pennsylvania.

Sample ID	Location	Matrix	Sample Depth	Analytes	Comments
S1503S	Lot 15	S	6-6.5 BGS	TCL/TAL, TPH, pH, THF, Pb	
S1503D	Lot 15	S	NS	TCL, THF, Pb, pH, TPH	Skipped - no black material encountered
S1504S	Lot 15	S	1-1.5 BGS	PCB, TPH, pH, Pb	Pb added in field
S1504D	Lot 15	S	NS	PCB, TPH, pH, Pb	Skipped - refusal
S1505S	Lot 15	S	1-1.5 BGS	PCB, TPH, pH	
S1505D	Lot 15	S	6.5-7 BGS	PCB, TPH, pH, Pb	
S1506S	Lot 15	S	0-1 BGS	PCB, TPH, pH	
S1506D	Lot 15	S	9-11 BGS	PCB, TPH, pH, Pb	
S1507S	Lot 15	S	1-2 BGS	PCB, TPH, pH	
S1507D	Lot 15	S	5-6 BGS	PCB, TPH, pH, Pb	
S1508S	Lot 15	S	1-2 BGS	PCB, TPH, pH	
S1508D	Lot 15	S	6-7 BGS	PCB, TPH, pH, Pb	
S1509S	Lot 15	S	1-2 BGS	PCB, TPH, pH	
S1509D	Lot 15	S	8-10 BGS	PCB, TPH, pH, Pb	
S1510S	Lot 15	S	1-2 BGS	PCB, TPH, pH	
S1510D	Lot 15	S	5-6 BGS	PCB, TPH, pH, Pb	
S1511S	Lot 15	S	1-2 BGS	PCB, TPH, pH	
S1511D	Lot 15	S	6-7 BGS	PCB, TPH pH, Pb	
B1512	Lot 15	S	0-.5 BGS	TCL/TAL	Black slag identical to slag found on Lots 14 and 17

All measurements are shown in feet.
NS = Not sampled.

Table 4. Summary of Biased and Non-Biased Samples/Analytes. FMC Corporation; Marcus Hook, Pennsylvania.

Sample ID	Location	Matrix	Sample Depth	Analytes	Comments
B1513	Lot 15	S	0-.5 BGS	TCL/TAL	Sample added in field of black stained soil on surface
S1701S	Lot 17	S	1-2 BGS	TCL, TPH, pH, THF, Pb	
S1701D	Lot 17	S	6-7 BGS	TCL, TPH, pH, THF, Pb	
S1702S	Lot 17	S	1-2 BGS	PCB, TPH, pH	
S1702D	Lot 17	S	9.5-10 BGS	VOC, PCB, TPH, pH, Pb	
S1703S	Lot 17	S	1-2 BGS	PCB, TPH, pH	
S1703D	Lot 17	S	3.5-4 BGS	PCB, TPH, pH, Pb	
S1704S	Lot 17	S	1-2 BGS	PCB, TPH, pH	
S1704D	Lot 17	S	7-8 BGS	PCB, TPH, pH, Pb	
S1705S	Lot 17	S	1-2 BGS	PCB, TPH, pH	
S1705D	Lot 17	S	6-7 BGS	PCB, TPH, pH, Pb	
S1706S	Lot 17	S	1-2 BGS	PCB, TPH, pH	
S1706D	Lot 17	S	4-5 BGS	PCB, TPH, pH, Pb	
S1707S	Lot 17	S	1-2 BGS	PCB, TPH, pH	
S1707D	Lot 17	S	5-6 BGS	PCB, TPH, pH, Pb	
S1708S	Lot 17	S	1-2 BGS	PCB, TPH, pH	
S1708D	Lot 17	S	7-8 BGS	PCB, TPH, pH, Pb	
S1709S	Lot 17	S	1-2 BGS	PCB, TPH, pH	
S1709D	Lot 17	S	8-9 BGS	VOC, PCB, TPH, pH, THF, Pb	THF & VOC added in field

All measurements are shown in feet.
NS = Not sampled.

ORIGINAL (Red)

Table 4. Summary of Biased and Non-Biased Samples/Analytes. FMC Corporation; Marcus Hook, Pennsylvania.

Sample ID	Location	Matrix	Sample Depth	Analytes	Comments
B1710	Lot 17	S	NS	TCL/TAL	Skipped - sample was taken as B1512
S2001S	Lot 20	S	4-5 BGS	VOC, TPH, THF	TPH & THF were added and pH, PCB, Asbestos & TAL were not sampled
S2001D	Lot 20	S	15-16 BGS	VOC, SVOA, PCB, TAL, Cyanide, TPH, pH, Asbestos	Sample was added in field
S2002	Lot 20	S	5-7 BGS	VOC, PCB, TAL, Cyanide, pH, Asbestos	
B2001	Lot 20	S	3.5-4 BGS	VOC, PCB, TAL, Cyanide, TPH, pH	
B2002	Lot 20	S	NS	TCL	Skipped - refusal
B2003	Lot 20	S	0-.5 BGS	PCB	Sample under transformers
B2004	Lot 20	S	0-.5 BGS	VOC, PCB, pH, Asbestos	Asbestos added in field
B2005S	Lot 20	S	0-.5 BGS	VOC, PCB, TAL, Cyanide, TPH	
B2005D	Lot 20	S	3.5-4 BGS	VOC, PCB, TAL, Cyanide, TPH	
B2006	Lot 20	S	NS	Asbestos	Skipped due to refusal - hit concrete pad
B2007	Lot 20	S	0-.5 BGS	VOC, PCB, TPH	Sample added in field
S2101	Lot 21	S	0-.5 BGS	VOC, PCB, TAL, pH, Asbestos	
S2102	Lot 21	S	0-.5 BGS	VOC, PCB, TAL, pH, Asbestos	
S2103	Lot 21	S	0-.5 BGS	VOC, PCB, TAL, pH, Asbestos	
S2104	Lot 21	S	0-.5 BGS	VOC, PCB, TAL, pH, Asbestos	
S2105	Lot 21	S	0-.5 BGS	VOC, PCB, TAL pH, Asbestos	
S2106	Lot 21	S	0-.5 BGS	VOC, PCB, TAL, pH, Asbestos	

All measurements are shown in feet.
NS = Not sampled.

Table 4. Summary of Biased and Non-Biased Samples/Analytes. FMC Corporation; Marcus Hook, Pennsylvania.

Sample ID	Location	Matrix	Sample Depth	Analytes	Comments
S2107	Lot 21	S	0-.5 BGS	VOC, PCB, TAL, pH, Asbestos	Sample added in field
S2108	Lot 21	S	0-.5 BGS	VOC, PCB, TAL, pH, Asbestos	Sample added in field
B2101	Lot 21	S	NS	VOC, PCB, TAL, TPH	Skipped - tank empty
S2201	Lot 22	S	0-.5 BGS	VOC, PCB, TAL, pH, Asbestos	
S2202	Lot 22	S	0-.5 BGS	VOC, PCB, TAL, pH, Asbestos	
S2203S	Lot 22	S	0-.5 BGS	VOC, PCB, TAL, pH, Asbestos	
S2203D	Lot 22	S	6-8 BGS	VOC, pH, THF	Sample added in field
S2204	Lot 22	S	0-.5 BGS	VOC, PCB, TAL, pH, Asbestos	
S2205	Lot 22	S	0-.5 BGS	VOC, PCB, TAL, pH, Asbestos	
S2206	Lot 22	S	0-.5 BGS	VOC, PCB, TAL, pH, Asbestos	
S2207	Lot 22	S	0-.5 BGS	VOC, PCB, TAL, pH, Asbestos	
S2208	Lot 22	S	0-.5 BGS	VOC, PCB, TAL, pH, Asbestos	
S2209	Lot 22	S	0-.5 BGS	VOC, PCB, TAL, pH, Asbestos	
S2210	Lot 22	S	0-.5 BGS	VOC, PCB, TAL, pH, Asbestos	
B2201	Lot 22	S	3-4 BGS	VOC	
B2202	Lot 22	S	7-8 BGS	TCL/TAL, THF	
B2203	Lot 22	S	3-4 BGS	VOC	
B2204	Lot 22	S	7-8 BGS	TCL/TAL, THF	

All measurements are shown in feet.
NS = Not sampled.

ORIGINAL (Red)

Table 5. Summary of Test Pit and Associated Sample Information. FMC; Marcus Hook, Pennsylvania.

Lot	Sample ID	Sample Depth	Sample Description	Test Pit ID	Total Depth of Trench
Lot 8	B0801	0.5-1.0	sample of gravelly sand material at base of paved area	TPB0801	1
Lot 9	S0901	0-3	composite of black-stained material and man-made fill	TPS0901	5
Lot 9	S0902	5-6	side-wall composite of tan-grey mottled silty clay	TPS0902	6
Lot 9	S0903	0.5-2.5	side-wall composite of clayey silt with trace gravel	TPS0903	4
Lot 9	S0904	0-3	composite of fill material and sand with gravel	TPS0904	5
Lot 9	S0905	4-6	composite of man-made fill and mottled tan-grey clayey silt	TPS0905	8
Lot 9	S0906	1-2	composite of man-made fill material and black-stained sandy gravel material	TPS0906	2.5
Lot 9	B0903	11-11.5	1 foot above powerhouse basement floor	TPB0903	12.5
Lot 10	S1001	3-8	side-wall composite of tan silty sand and grey-tan mottled clay	TPS1001	8
Lot 10	S1003	3-8	side-wall composite of grey clay and tan-grey clay	TPS1003	9.5
Lot 10	S1004	7-8	composite sample of tan-grey fill (bricks, concrete, etc.)	TPS1004	8
Lot 10	S1005	9.5-11	composite sample of interlayered coal and silty clay	TPS1005	11
Lot 10	S1006	6-6.5	grab sample of unknown white milky substance within tan-grey fill	TPS1004	8
Lot 10	B1001	3-4	black coal-like material in collapsed ditch over sewer line; approximately 3-4' below surrounding ground surface	TPB1001	8
Lot 10	B1002	7.5-8	composite of black coal-like material and tan clayey silt with gravel from side-wall of test pit; approimately 7.5-8' below surrounding ground surface	TPB1001	8
Lot 11	S1101	7-8	composite sample of tan-grey silty sand mixed with grey clay; depth of spray pond	TPS1101	9
Lot 11	S1102	8.5-9	side-wall composite of tan-grey silty sand with grey clay streaks; depth of spray pond	TPS1102	9
Lot 11	S1103	8-9	composite sample of black coal-like material and gravel; depth of spray pond	TPS1103	11
Lot 11	B1101	3.5-4	material above concrete spray pond bottom in spray pond foundation	TPB1101	4

Note: All samples listed above required use of backhoe and excavation to collect sample.
All depths reported in feet below ground surface (BGS).
NA = Not applicable; sample not taken from a test pit using backhoe.

Table 5. Summary of Test Pit and Associated Sample Information. FMC; Marcus Hook, Pennsylvania.

Lot	Sample ID	Sample Depth	Sample Description	Test Pit ID	Total Depth of Trench
Lot 11/12	B1104	4.5-5	grab sample of black substance within a 6" diameter cast iron pipe	TPS1101	9
Lot 12	S1201	9.5-10.5	side-wall composite of silty tan-grey fill and dark tan-grey mottled clay with gravel	TPS1201	11.5
Lot 12	S1202	10-11	tan, historical silty soil	TPS1202	11
Lot 12	S1203	11-11.5	composite of tan-grey silty fill with clay	TPS1203	11.5
Lot 12	S1204	11-11.5	composite of tan-grey silty sand and fill material	TPS1204	12
Lot 12	S1205	8.5-11.5	side-wall composite of grey silty clay and tan silty sand	TPS1205	11.5
Lot 12	S1206	7-8	side-wall composite of moist, silty tan-grey mottled clay	TPS1206	10
Lot 12	S1207	9-9.5	composite of tan silty sand with clay	TPS1207	11
Lot 12	B1201	9-9.5	back-wall grey-tan silty clay sample	TPB1201	11.5
Lot 12	B1201D	10.5-11.5	grab sample of black-stained viscose-like material	TPB1201	11.5
Lot 12	B1202	2.5-3.5	composite sample of man-made fill	TPB1202	10
Lot 12	B1203	7-8	composite of black coal-like material and silty sand with trace gravel	TPB1203	12
Lot 12	B1207	0-1	grab sample of organic soil below debris pile	TPB1207	1
Lot 12	B1208	9	aqueous sample taken from pit TPB1202 - slight sheen on water	TPB1202	10
Lot 13	S1301	4-6	side-wall composite of grey to dark tan silty clay	TPS1301	11
Lot 13	S1302	9-11	composite of man-made fill and tan silty sand	TPS1302	11
Lot 13	S1303	5-7	tan-grey clayey, silty sand	TPS1303	7
Lot 13	S1304	4.5-6.5	side-wall composite of dark black silty soil and tan clayey silty soil	TPS1304	7
Lot 13	B1302	0-0.5	grab sample of man-made fill below railroad ties	TPB1302	0.5
Lot 13	B1303	6-6.5	composite of tan-brown silty clay	TPB1303	7
Lot 13	B1304	6-7	sandy, tan-grey mottled clayey silt	TPB1304	10

Note: All samples listed above required use of backhoe and excavation to collect sample.
All depths reported in feet below ground surface (BGS).
NA = Not applicable; sample not taken from a test pit using backhoe.

Table 5. Summary of Test Pit and Associated Sample Information. FMC; Marcus Hook, Pennsylvania.

Lot	Sample ID	Sample Depth	Sample Description	Test Pit ID	Total Depth of Trench
Lot 13	B1307	6-7	grab sample of debris/sludge in base of spray pond	TPB1307	7
Lot 13	B1308	0-1	grab sample of man-made fill matrix below a pile of wooden pallets and debris	TPB1308	1
Lot 14	S1401	0-0.5	back-wall composite sample of of organic horizon and fill pile above organic horizon	TPS1401	6
Lot 14	S1402	6-7	composite sample of grey clay with silty sand	TPS1402	10
Lot 14	S1403	0-1	grab sample of clayey, sandy silt from below debris pile	TPS1403	1
Lot 14	S1404	8.5-11.5	composite of fill material	TPS1404	13
Lot 14	B1403S	0.5-1	grab sample of man-made fill	TPB1403	1
Lot 14	B1404	0-0.5	composite of surface topsoil	NA	NA
Lot 14	B1405	1.5-2	composite of man-made fill/debris comprising mound	TPB1405	2
Lot 14	B1406	3.5-5.5	composite of tan-grey mottled clay and fill from back wall of test pit	TPB1406	10.5
Lot 14	B1407S	1-3	composite of coal and clayey fill	TPB1407	13
Lot 14	B1407D	10-12	composite of clay with silty sand	TPB1407	13
Lot 14	B1408	0-1	grab sample of man-made fill below debris pile	TPB1408	1
Lot 15	S1501S	7-8	grab sample of ash	TPS1501	11.5
Lot 15	S1501D	11-11.5	grab sample of material below ash	TPS1501	11.5
Lot 15	S1502S	9-10	back-wall grab sample of black coal-like material	TPS1502	10
Lot 15	S1502D	NA	not sampled—encountered concrete foundation	NA	10
Lot 15	S1503S	6-6.5	side-wall composite of clayey silt	TPS1503	18
Lot 15	S1504S	1-1.5	grab sample of man-made fill	TPS1504	4
Lot 15	S1505S	1-1.5	grab sample of man-made fill	TPS1505	7
Lot 15	S1505D	6.5-7	trench bottom composite of man-made fill and unknown brown to black fluid	TPS1505	7

Note: All samples listed above required use of backhoe and excavation to collect sample.
All depths reported in feet below ground surface (BGS).
NA = Not applicable; sample not taken from a test pit using backhoe.

ORIGINAL (Red)

Table 5. Summary of Test Pit and Associated Sample Information. FMC; Marcus Hook, Pennsylvania.

Lot	Sample ID	Sample Depth	Sample Description	Test Pit ID	Total Depth of Trench
Lot 15	S1506S	0-1	grab sample of organic soil within man-made fill/debris	TPS1506	14
Lot 15	S1506D	9-11	side-wall composite of mottled tan-grey clayey silt and sand and gravel with silt and trace clay	TPS1506	14
Lot 15	S1507S	1-2	grab sample of loose man-made fill/debris	TPS1507	6
Lot 15	S1507D	5-6	grab sample of loose soil base of basement foundation	TPS1507	6
Lot 15	S1508S	1-2	grab sample of black-stained, tan, clayey sandy silt	TPS1508	7
Lot 15	S1508D	6-7	side-wall grab sample of mottled tan-grey clayey, silty sand; some stained grey	TPS1508	7
Lot 15	S1509S	1-2	grab sample of black-stained clayey silty sand	TPS1509	12
Lot 15	S1509D	8-10	composite of grey-pink sand	TPS1509	12
Lot 15	S1510S	1-2	grab sample of black-stained mottled tan-grey clayey silt	TPS1510	8
Lot 15	S1510D	5-6	grab sample of grey-pink clayey, sandy silt	TPS1510	8
Lot 15	S1511S	1-2	grab sample of organic black-stained tan clayey, sandy silt	TPS1511	7
Lot 15	S1511D	6-7	side-wall grab sample of mottled grey clayey silty sand; some stained grey	TPS1511	7
Lot 17	S1701S	1-2	grab sample of loose soil beneath railroad ties	TPS1701	10
Lot 17	S1701D	6-7	grab sample of grey silty clay	TPS1701	10
Lot 17	S1702S	1-2	grab sample of loose organic soil within stone fill	TPS1702	10
Lot 17	S1702D	9.5-10	grab sample of sand and silty clay	TPS1702	10
Lot 17	S1703S	1-2	grab sample of loose organic soil within stone fill	TPS1703	7
Lot 17	S1703D	3.5-4	grab sample of grey clayey silt	TPS1703	7
Lot 17	S1704S	1-2	grab sample of loose soil within fill	TPS1704	9
Lot 17	S1704D	7-8	grab sample of mottled tan-grey silty clay	TPS1704	9
Lot 17	S1705S	1-2	grab sample of black-stained sandy, clayey silt	TPS1705	10
Lot 17	S1705D	6-7	grab sample of mottled tan-grey, micaceous, clayey silt	TPS1705	10

Note: All samples listed above required use of backhoe and excavation to collect sample.
All depths reported in feet below ground surface (BGS).
NA = Not applicable; sample not taken from a test pit using backhoe.

Table 5. Summary of Test Pit and Associated Sample Information. FMC; Marcus Hook, Pennsylvania.

Lot	Sample ID	Sample Depth	Sample Description	Test Pit ID	Total Depth of Trench
Lot 17	S1706S	1-2	grab sample of silt and sand below macadam	TPS1706	11
Lot 17	S1706D	4-5	grab sample of mottled tan-grey silty clay	TPS1706	11
Lot 17	S1707S	1-2	grab sample of loose sand within stone fill and gravel	TPS1707	8
Lot 17	S1707D	5-6	grab sample of mottled tan-grey clayey silt	TPS1707	8
Lot 17	S1708S	1-2	grab sample of clayey, sandy silt within gravel	TPS1708	10
Lot 17	S1708D	7-8	grab sample of orange and grey-stained silty sand	TPS1708	10
Lot 17	S1709S	1-2	grab sample of clayey silt and sand	TPS1709	9
Lot 17	S1709D	8-9	grab sample of soil and sludge on concrete pad	TPS1709	9
Lot 20	S2001S	4-5	composite sample of black coal-like material	TPS2001	16
Lot 20	S2001D	15-16	composite sample of tan silty sand	TPS2001	16
Lot 20	S2002	5-7	composite sample of tan clayey silty sand	TPS2002	12
Lot 20	B2001	3.5-4	grab sample 0.5' below adjacent concrete pad	TPB2001	6
Lot 20	B2003	0-0.5	composite sample of topsoil around transformers	NA	NA
Lot 20	B2005S	0-0.5	composite sample of surface topsoil	TPS2005	4
Lot 20	B2005D	3.5-4	grab sample of mottled tan-grey clayey silt	TPS2005	4
Lot 22	S2203S	0-0.5	composite sample of surface topsoil	TPS2203	12
Lot 22	S2203D	6-8	composite of black-stained clayey silt and grey-green clayey silt	TPS2203	12
Lot 22	B2201	3-4	grab sample of fill and interstitial soil	TPB2201	10
Lot 22	B2202	7-8	grab sample of grey-tan mottled clay	TPB2201	10
Lot 22	B2203	3-4	grab sample of fill and interstitial soil	TPB2203	8
Lot 22	B2204	7-8	grab sample of grey-tan mottled clay	TPB2203	8

Note: All samples listed above required use of backhoe and excavation to collect sample.
All depths reported in feet below ground surface (BGS).
NA = Not applicable; sample not taken from a test pit using backhoe.

Table 6. Lot 8 - Summary of Soil Analytical Results, Volatile Organic Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	B0801	B0802
Methylene Chloride	**0.014B**	**0.009BJ**
Acetone	**0.047B**	**0.007BJ**
2-Butanone	**0.009J**	0.011U
Total Volatiles	**0.07BJ**	**0.016BJ**

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
J = Detected below method detection limit.

Table 6. Lot 8 - Summary of Soil Analytical Results, PCB, Total Petroleum Hydrocarbon, pH, and Asbestos FMC; Marcus Hook, Pennsylvania.

Parameter	B0801	B0802
Total PCB	<0.020	**1.2**
TPH	NA	**1,420**
pH	**6.7**	NA
Asbestos		
Chrysotile	ND	ND
Amosite	ND	**<1%**
Crocidolite	ND	ND
Other	ND	ND
Non-Asbestos		
Cellulose	**2-3%**	**5-10%**
Fibrous Glass	ND	**2-4%**
Quartz	**80-85%**	**50-55%**
Calcite	ND	**15-20%**
Pumice	**5-7%**	ND

Concentrations reported in milligrams per kilogram (mg/kg).
NA = Not analyzed.
ND = Not detected.

Table 7. Lot 9 - Summary of Soil Analytical Results, Volatile Organic Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	S0901	S0902	S0903	S0904	S0905	S0906	B0901	B0903
Methylene Chloride	**0.011BJ**	**0.015B**	**0.019B**	**0.024B**	**0.018B**	**0.13B**	**0.017B**	**0.008BJ**
Acetone	**0.014B**	**0.012BJ**	**0.022B**	**0.046B**	**0.017B**	**0.24B**	**0.008BJ**	**0.086B**
Ethylbenzene	0.012U	0.012U	0.012U	0.011U	0.012U	**0.011J**	0.011U	0.012U
Total Xylene	0.012U	0.012U	0.012U	0.011U	0.012U	**0.039J**	0.011U	0.012U
Total Volatiles	**0.025BJ**	**0.027BJ**	**0.041B**	**0.07B**	**0.035B**	**0.42BJ**	**0.025BJ**	**0.094BJ**

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
J = Detected below method detection limit.
U = Not detected.

Table 7. Lot 9 - Summary of Soil Analytical Results, Base-Neutral Extractable Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	B0901
2-methylnaphthalene	3.8J
Acenaphthene	1.6J
Fluorene	1.9J
Phenanthrene	3.1J
Fluroanthene	2.1J
Pyrene	11
Benzo Anthracene	5.2J
Chrysene	11
Benzo(b)fluoranthene	2.8JX
Benzo(k)fluoranthene	2.8JX
Benzo Pyrene	4.1J
Indeno Pyrene	1.8J
Dibenz Anthracene	1.9J
Benzo Perylene	3.9J
Total Base-Neutrals	**57JX**

Concentrations reported in milligrams per kilogram (mg/kg).
J = Detected below method detection limit.
X = Other specific footnotes may be erquired to properly define results.

Table 7. Lot 9 - Summary of Soil Analytical Results, Priority Pollutant Metals. FMC; Marcus Hook, Pennsylvania.

Parameter	S0901	S0902	S0903	S0904	S0905	S0906	B0903
Aluminum	12,000	12,500	11,500	8,170	2,620	2,140	10,800
Antimony	12.9U	13.1U	14.5	12.4U	12.9	12.4	13.5U
Arsenic	15.9	3.0	9.6	9.8	88.3	80.0	16.3
Barium	124	55.6	114	120	240	149	1,210
Beryllium	0.56B	0.51B	0.71B	0.72B	0.31B	0.23U	0.75B
Calcium	2,310	982B	4,820	2,630	1,390	398B	7,530
Chromium	45.3	19.8	28.2	33.6	14.0	6.5	28.1
Cobalt	8.1B	5.1B	8.5B	7.8B	2.5B	3.7B	13.3
Copper	37.6	11.4	106	40.2	74.0	15.5	41.2
Iron	26,400	15,900	26,100	21,600	38,900	30,800	20,500
Lead	50.0	13.0	624	101	616	42.3	103
Magnesium	4,740	1,770	2,660	2,440	845B	400	3,060
Manganese	186	95.8	322	155	30.7	34.9	357
Mercury	0.43	0.12U	0.64	0.50	2.7	0.42	1.1
Nickel	23.6	23.5	37.6	21.7	13.3	17.5	37.0
Potassium	2,300	798B	1,100B	1,830	1,070B	678B	1,160B
Selenium	0.72U	0.73U	0.72U	0.69U	3.8	5.4	0.75U
Sodium	307B	175B	200B	295B	452B	159B	305
Thallium	0.48U	0.49U	0.48U	0.46U	0.48U	1.7B	0.50U
Vanadium	46.5	95.4	59.1	53.7	503	57.5	211
Zinc	68.5	37.3	307	87.4	64.6	17.1	489

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
U = Not detected.

Table 7. Lot 9 - Summary of Soil Analytical Results, PCB, Total Petroleum Hydrocarbon, pH, and Asbestos. FMC; Marcus Hook, Pennsylvania.

Parameter	S0901	S0902	S0903	S0904	S0905	S0906	B0901	B0902	B0903
Total PCB	0.088	0.041	0.13	1.3	0.88	<002	2.3	NA	0.58
TPH	NA	NA	NA	NA	NA	60,500	65,500	NA	364
pH	6.4	5.3	8.1	8.2	7.6	6.8	NA	NA	NA
Asbestos									
Chyrsotile	<1%	<1%	<1%	ND	<1%	<1%	2-3%	1-2%	NA
Amosite	ND	<1%	<1%	ND	ND	ND	1-2%	5-6%	NA
Crocidolite	ND	ND	ND	ND	ND	ND	ND	ND	NA
Other	ND	ND	ND	ND	ND	ND	ND	ND	NA
Non-Asbestos									
Cellulose	2-3%	1-4%	3-5%	2-4%	4-5%	5-6%	5-8%	5-10%	NA
Fibrous Glass	ND	ND	ND	ND	ND	ND	2-3%	ND	NA
Quartz	75-80%	75-80%	70-75%	75-80%	80-85%	80-85%	55-60%	55-60%	NA
Calcite	3-5%	ND	ND	5-10%	2-3%	1-2%	10-15%	10-15%	NA
Pumice	ND	5-10%	10-15%	ND	ND	ND	ND	ND	NA

Concentrations reported in milligrams per kilogram (mg/kg)
NA = Not analyzed.
ND = Not detected.

Table 8. Lot 10 - Summary of Soil Analytical Results, Volatile Organic Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	S1001	S1003	S1004	S1005	B1001	B1002
Methylene Chloride	**.014B**	**.025B**	**.007BJ**	**.016B**	**.012BJ**	**.015B**
Acetone	**.025B**	**.043B**	**.037B**	**.038B**	.012U	**.062B**
Total Volatiles	**.039B**	**.068B**	**.044BJ**	**.054B**	**.012BJ**	**.077B**

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
J = Detected below method detection limit.
U = Not detected.

Table 8. Lot 10 - Summary of Soil Analytical Results, Base-Neutral Extractable Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	B1001
Naphthalene	**0.35J**
2-Methylnaphthalene	**0.82J**
Acenaphthylene	**0.31J**
Acenaphthene	**0.23J**
Dibenzofuran	**0.46J**
Phenanthrene	**1.6J**
Anthracene	**0.47J**
Carbazole	**0.24J**
Di-n-Butylphthalate	**0.53J**
Fluoranthene	**2.9**
Pyrene	**2.4**
Benzo(a)Anthracene	**2.3**
Chrysene	**2.5**
Benzo(b)Fluoranthene	**4.8X**
Benzo(k)Fluoranthene	**4.8X**
Benzo(a)Pyrene	**2.1**
Indeno Pyrene	**1.3J**
Dibenz Anthracene	**0.49J**
Benzo Perylene	**1.3J**
Total Base-Neutrals	**29.9JX**

Concentrations reported in milligrams per kilogram (mg/kg).
J = Detected below method detection limit.
X = Other footnotes may be required to properly define results.

Table 8. Lot 10 - Summary of Soil Analytical Results, Priority Pollutant Metals and Cyanide. FMC; Marcus Hook, Pennsylvania.

Parameter	S1006	B1001
Aluminum	**1,690**	**3,880**
Arsenic	**2.7B**	**15.4**
Barium	**11.9B**	**233**
Beryllium	**0.42B**	**0.58B**
Cadmium	1.9U	**1.5**
Calcium	**210,000**	**3,050**
Chromium	2.6U	**20.9**
Cobalt	3.4U	**7.9B**
Copper	**21.8**	**80.8**
Iron	**5.710**	**23,600**
Lead	**4.5B**	**346**
Magnesium	**568B**	**1,970**
Manganese	**477**	**148**
Mercury	0.19U	**2.5**
Nickel	**20.2**	**109**
Potassium	1,080U	**1,710**
Selenium	11.3U	**2.1**
Sodium	**404B**	**318B**
Thallium	0.76U	**0.54B**
Vanadium	**28.4**	**698**
Zinc	**67.7**	**197**
Cyanide	NA	0.63U

Concentrations recorded in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
U = Not detected.
NA = Not analyzed.

Table 8. Lot 10 - Summary of Soil Analytical Results, PCB, Phenol, pH, Total Organic Carbon and Asbestos. FMC; Marcus Hook, Pennsylvania.

Parameter	S1001	S1003	S1004	S1005	S1006	B1001	B1002
Total PCBs	**0.1**	<0.2	<0.02	<0.2	NA	**2.3**	**0.15**
Total Phenols	NA	NA	NA	NA	NA	**0.11**	NA
pH	**6.0**	**7.4**	**6.4**	**5.5**	NA	NA	**7.1**
TOC	NA	NA	NA	NA	**6,106**	NA	NA
Asbestos							
Chrysotile	ND	ND	ND	ND	NA	NA	NA
Amosite	ND	ND	ND	ND	NA	NA	NA
Crocidolite	ND	ND	ND	ND	NA	NA	NA
Other	ND	ND	ND	ND	NA	NA	NA
Non-Asbestos							
Cellulose	**1-2%**	**2-3%**	**1-2%**	**<1%**	NA	NA	NA
Fibrous Glass	ND	ND	ND	ND	NA	NA	NA
Quartz	**80-85%**	**85-90%**	**85-90%**	**75-80%**	NA	NA	NA
Calcite	**5-6%**	ND	ND	**5-6%**	NA	NA	NA
Pumice	ND	ND	**5-6%**	**3-4%**	NA	NA	NA

Concentrations reported in milligrams per kilogram (mg/kg).
NA = Not analyzed.
ND = Not detected.

ORIGINAL (Red)

Table 9. Lot 11 - Summary of Soil Analytical Results, Volatile Organic Compounds. FMC Marcus Hook, Pennsylvania.

Parameter	S1101	S1102	S1103	B1101	B1103	B1104[a]
Methylene Chloride	**0.026B**	**0.01BJ**	**0.005BJ**	**0.012B**	**0.48BE**	**0.34B**
Acetone	**0.11B**	**0.039B**	**0.037B**	**0.2B**	**0.032B**	1.6U
Toluene	0.012U	0.012U	0.011U	0.011U	0.011U	**0.72J**
Chlorobenzene	0.012U	0.012U	0.011U	0.011U	0.011U	1.6U
Ethylbenzene	0.012U	0.012U	0.011U	0.011U	0.011U	**0.18J**
Total Xylenes	0.012U	0.012U	0.011U	0.011U	0.011U	**1.1J**
Total Volatiles	**0.136B**	**0.049BJ**	**0.042BJ**	**0.212B**	**0.512BE**	**2.34BJ**

Concentrations reported in milligrams per kilogram (mg/kg).
[a]Field sample B1102 collected on April 29, 1992 has been renamed B1104.
B = Detected in associated blank.
E = Compound concentrations exceed the calibration for the GC/MS instrument.
J = Detected below method detection limit.
U = Not detected.

ORIGINAL (Red)

ORIGINAL (Red)

Table 9. Lot 11 - Summary of Soil Ananlytical Results, Base-Neutral Extractable Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	B1103
1,3-Dichlorobenzene	0.37U
1,4-Dichlorobenzene	0.37U
1,2-Dichlorobenzene	0.37U
Nitrobenzene	**0.061J**
1,2,4-Trichlorobenzene	0.37U
Naphthalene	**0.44**
2-Methylnaphthalene	**0.53**
Acenaphthylene	**0.13J**
Acenaphthene	**0.061J**
Dibenzofuran	**0.27J**
Fluorene	**0.075J**
Phenanthrene	**1.2**
Anthracene	**0.17J**
Carbazole	**0.17J**
Di-n-Butylphthalate	**0.31J**
Fluoranthene	**2.3**
Pyrene	**1.0**
Butylbenzylphthalate	**0.35BJ**
Benzo(a)Anthracene	**1.0**
Chrysene	**1.5**
bis Phthalate	**0.1J**
Benzo(b)Fluoranthene	**2.3**
Benzo(k)Fluoranthene	**2.3X**
Benzo Pyrene	**0.51X**
Indeno Pyrene	**0.37**
Dibenz Anthracene	**0.23J**
Benzo Perylene	**0.3J**
Total Base-Neutrals	**15.367BJX**

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
E = Compound concentrations exceeded the calibration for the GC/MS instrument for that specific analysis.
J = Detected below method detection limit.
U = Not detected.
X = Other footnotes may be required to properly define results.

Table 9. Lot 11 - Summary of Soil Analytical Results, Priority Pollutant Metals and Cyanide. FMC; Marcus Hook, Pennsylvania.

Parameter	B1103
Aluminum	**982**
Arsenic	**44.1**
Barium	**102**
Beryllium	**0.37B**
Calcium	**329B**
Chromium	**6.5**
Cobalt	2.0U
Copper	**35.8**
Iron	**22,400**
Lead	**150**
Magnesium	**332B**
Manganese	**44.0**
Mercury	**1.6**
Nickel	**8.6B**
Potassium	**822**
Selenium	**2.7**
Sodium	**466B**
Vanadium	**31.0**
Zinc	**38.7**
Cyanide	0.56U

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
U = Not detected.

Table 9. Lot 11 - Summary of Soil Analytical Results, PCB, Phenol, Total Petroleum Hydrocarbon, pH, and Asbestos. FMC; Marcus Hook, Pennsylvania.

Parameter	S1101	S1102	S1103	B1101	B1103	B1104[a]
Total PCBs	<0.02	<0.02	<0.02	NA	2.3	<0.02
Total Phenols	NA	NA	NA	NA	<0.10	NA
TPH	NA	NA	NA	NA	NA	14,100
pH	5.2	4.3	4.2	8.6	NA	NA
Asbestos						
Chrysotile	ND	ND	ND	NA	NA	NA
Amosite	ND	ND	ND	NA	NA	NA
Crocidolite	ND	ND	ND	NA	NA	NA
Other	ND	ND	ND	NA	NA	NA
Non-Asbestos						
Cellulose	1%	ND	ND	NA	NA	NA
Fibrous Glass	ND	ND	ND	NA	NA	NA
Quartz	75-80%	75-80%	80-85%	NA	NA	NA
Calcite	5-10%	5-6%	4-5%	NA	NA	NA

Concentrations reported in milligrams per kilogram (mg/kg).
[a]Field sample B1102 collected on April 29, 1992, has been renamed B1104.
NA = Not analyzed.
ND = Not detected.

Table 10. Lot 12 - Summary of Soil Analytical Results, Volatile Organic Compounds. FMC Marcus Hook, Pennsylvania.

Parameter	S1201	S1202	S1203	S1204	S1205	S1206	S1207	B1201	B1202	B1203	B1204	B1207	B1208
Methylene Chloride	**0.012BJ**	**0.015B**	**0.041B**	**0.047B**	**0.017B**	**0.022B**	**0.016B**	**0.019B**	**0.083B**	**0.027B**	**0.016B**	**0.013B**	0.01U
Acetone	**0.044B**	**0.074B**	**0.16B**	**0.15B**	**0.056B**	**0.13B**	**0.16B**	**0.043B**	**0.083B**	**0.096B**	**0.02B**	**0.054B**	0.01U
Carbon Disulfide	0.012U	0.013U	**0.002J**	0.012U	0.012U	0.011U	**0.006J**	0.012U	0.011U	0.012U	0.012U	0.012U	0.01U
2-Butone	0.012U	0.013U	**0.015**	0.012U	0.012U	0.011U	0.012U	0.012U	0.011U	0.012U	0.012U	0.012U	0.01U
Total Volatiles	**0.056BJ**	**0.089B**	**0.218B**	**0.197B**	**0.073B**	**0.152B**	**0.182B**	**0.062B**	**0.166B**	**0.123B**	**0.036B**	**0.067B**	**0.01U**

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
J = Detected below method detection limit.
U = Not detected.

Table 10. Lot 12 - Summary of Soil Analytical Results, Base-Neutral Extractable Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	B1204	B1208
Phenol	**0.1J**	0.01U
4-Methylphenol	**0.047J**	0.01U
Isophorone	**0.37J**	0.01U
1,2,4 Trichlorobenzene	**0.15J**	0.01U
Naphthalene	**0.68**	0.01U
2-methylnaphthalene	**0.28J**	0.01U
Dimethyl Phthalate	**0.87**	0.01U
Acenaphthylene	**0.073J**	0.01U
Acenaphthene	**0.22J**	0.01U
Dibenzofuran	**0.29J**	0.01U
Diethylphthalate	0.39U	**0.002J**
Fluorene	**0.44**	0.01U
Phenanthrene	**2.0**	0.01U
Anthracene	**0.44**	0.01U
Carbazole	**0.33J**	0.01U
Di-n-Butylphthalate	**3.8**	**0.001J**
Fluoranthene	**2.1**	0.01U
Pyrene	**2.0**	0.01U
Butylbenzylphthalate	**1.1B**	0.01U
Benzo(a)Anthracene	**1.2**	0.01U
Chrysene	**1.3**	0.01U
bis Phthalate	**0.3BJ**	**0.01B**
Benzo(b)Fluoranthene	**1.1**	0.01U
Benzo(k)Fluoranthene	**1.0**	0.01U
Benzo(a)Pyrene	**1.1**	0.01U
Indeno Pyrene	**0.4**	0.01U
Dibenz Anthracene	**0.19J**	0.01U
Benzo Perylene	**0.36J**	0.01U
Total Base-Neutrals	**22.24**	**0.013BJ**

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
J = Detected below method detection limit.
U = Not Detected.
X = Other footnotes may be required to properly define results.

Table 10. Lot 12 - Summary of Soil Analytical Results, Priority Pollutant Metals and Cyanide. FMC; Marcus Hook, Pennsylvania.

Parameter	S1201	S1202	S1203	S1204	S1205	S1206	S1207
Aluminum	10,300	20,900	8,820	9,670	8,120	11,000	13,900
Arsenic	0.81B	14.3	6.3	12.5	6.4	2.9	4.9
Barium	27.2B	220	68.4	55.9	49.5	42.0B	36.9B
Beryllium	0.35B	0.63B	0.44B	0.59B	0.33B	0.53B	0.39B
Calcium	390B	1,450	2,870	674B	504B	417B	628B
Chromium	26.4	82.9	86.7	26.5	24.2	22.0	31.0
Cobalt	2.2U	14.0	7.9B	7.6B	3.8B	8.8B	5.7B
Copper	8.2	48.0	106	20.9	63.7	9.6	10.8
Iron	5,840	72,200	47,000	41,700	14,700	18,600	13,700
Lead	4.6	10.9	84.4	26.5	28.0	8.3	6.6
Magnesium	737B	9,440	1,590	2,210	1,990	2,320	2,310
Manganese	28.5	163	520	126	59.7	272	62.9
Mercury	0.12U	0.13U	0.12U	0.24	0.12U	0.12U	0.13U
Nickel	7.1B	32.6	68.3	13.5	16.9	13.2	13.3
Potassium	700U	9,120	874B	1,140B	722	1,080B	812B
Selenium	0.73U	0.77U	0.75U	1.1B	0.71U	0.71U	0.75U
Sodium	138B	323B	1,730	238B	129B	404B	315B
Vanadium	34.1	82.4	22.5	29.0	26.1	29.5	47.8
Zinc	18.2	62.0	133	40.4	56.9	39.1	39.8
Cyanide	NA	NA	NA	NA	NA	NA	NA

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
U = Not detected.

Table 10. Lot 12 - Summary of Soil Analytical Results, Priority Pollutant Metals and Cyanide. FMC; Marcus Hook, Pennsylvania.

Parameter	B1201	B1201D	B1202	B1203	B1204	B1207	B1208
Aluminum	**13,500**	**6,510**	**5,230**	**3,010**	**7,700**	**15,100**	**2,510**
Antimony	13.5U	12.7U	12.3U	12.9U	**23.2**	12.7U	54.0U
Arsenic	**7.7**	**10.0**	**7.1**	**147**	**35.2**	**6.4**	**5.2B**
Barium	**61.4**	**31.5B**	**629**	**40.9B**	**402**	**159**	**91.9B**
Beryllium	**0.69B**	**1.5**	**0.35B**	0.24U	**0.49B**	**0.73B**	1.0U
Cadmium	1.2U	1.2U	**3.2**	1.2U	**1.8**	1.2U	5.0U
Calcium	**6,190**	**1,350**	**46,100**	**312B**	**11,300**	**5,240**	**430,000**
Chromium	**26.0**	**35.4**	**19.5**	**10.5**	**57.1**	**37.8**	**7.5B**
Cobalt	**11.9B**	**3.9B**	**5.6B**	2.2U	**11.1B**	**10.4B**	9.0U
Copper	**33.1**	**9.3**	**698**	**7.9**	**195**	**64.8**	**225**
Iron	**17,700**	**26,900**	**31,500**	**38,100**	**44,600**	**25,700**	**7,850**
Lead	**30.1**	**4.5**	**385**	**10.3**	**924**	**137**	**78.6**
Magnesium	**3,210**	**1,160B**	**5,530**	**773B**	**4,420**	**4,650**	**69,100**
Manganese	**263**	**64.0**	**259**	**34.0**	**451**	**260**	**426**
Mercury	**0.25**	0.12U	**28.5**	0.12U	**11.3**	**1.6**	**4.3**
Nickel	**22.4**	**8.0B**	**27.3**	**3.1B**	**61.2**	**33.6**	**56.1**
Potassium	**1,480**	673U	**1,210**	**960B**	**1,860**	**4,220**	**27,100**
Selenium	0.75U	0.70U	**1.1B**	**2.6**	0.72U	0.70U	15.0U
Silver	2.5U	2.3U	**8.3**	2.4U	2.4U	2.3U	10.0U
Sodium	**313B**	**223B**	**610B**	**530B**	**403B**	**758B**	**332,000**
Vanadium	**29.4**	**38.4**	**20.6**	**25.6**	**68.9**	**46.0**	7.0U
Zinc	**683**	**141**	**1,170**	**18.7**	**803**	**299**	**778**
Cyanide	NA	NA	NA	NA	0.60U	NA	10.0U

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
U = Not detected.

Table 10. Lot 12 - Summary of Soil Analytical Results, PCB, Phenol, Total Petroleum Hydrocarbon, pH, Total Organic Carbon, and Asbestos. FMC; Marcus Hook, Pennsylvania.

Parameter	S1201	S1202	S1203	S1204	S1205	S1206	S1207
Total PCB	<0.02	<0.02	<0.20	**0.46**	<0.02	**2.1**	<0.02
Total Phenols	NA	NA	NA	NA	NA	NA	NA
TPH	NA	NA	NA	NA	NA	NA	NA
pH	**7.2**	**3.7**	**5.8**	**4.3**	**5.1**	**6.6**	**6.7**
TOC	NA	NA	NA	NA	NA	NA	NA
Asbestos							
Chrysotile	ND	ND	**<1%**	ND	ND	ND	ND
Amostie	ND	ND	ND	ND	ND	ND	ND
Crocidolite	ND	ND	**<1%**	ND	ND	ND	ND
Other	ND	ND	ND	ND	ND	ND	ND
Non-Asbestos							
Cellulose	**<1%**	ND	**3-5%**	**1-2%**	ND	**1-2%**	**1-2%**
Fibrous Glass	ND	ND	ND	ND	ND	ND	ND
Quartz	**75-80%**	**80-85%**	**75-80%**	**75-80%**	**85-90%**	**80-85%**	**80-85%**
Calcite	ND	**5-6%**	ND	**5-7%**	**5-6%**	**5-10%**	ND

Concentrations reported in milligrams per kilogram (mg/kg).
NA = Not analyzed.
ND = Not detected.

Table 10. Lot 12 - Summary of Soil Analytical Results, PCB, Phenol, Total Petroleum Hydrocarbon, pH, Total Organic Carbon, and Asbestos. FMC; Marcus Hook, Pennsylvania.

Parameter	B1201	B1201D	B1202	B1203	B1204	B1207	B1208
Total PCB	<0.02	NA	**2.3**	NA	**2.4**	**0.44**	**0.001**
Total Phenols	NA	NA	NA	NA	**0.11**	NA	<.010
TPH	NA	NA	NA	NA	NA	**2,050**	NA
pH	**7.6**	NA	**7.3**	**3.7**	NA	NA	NA
TOC	NA	**928**	NA	NA	NA	NA	NA
Asbestos							
Chrysotile	NA	NA	NA	NA	NA	NA	NA
Amostie	NA	NA	NA	NA	NA	NA	NA
Crocidolite	NA	NA	NA	NA	NA	NA	NA
Other	NA	NA	NA	NA	NA	NA	NA
Non-Asbestos							
Cellulose	NA	NA	NA	NA	NA	NA	NA
Fibrous Glass	NA	NA	NA	NA	NA	NA	NA
Quartz	NA	NA	NA	NA	NA	NA	NA
Calcite	NA	NA	NA	NA	NA	NA	NA

Concentrations reported in milligrams per kilogram (mg/kg).
NA = Not analyzed.
ND = Not detected.

ORIGINAL (Red)

Table 11. Lot 13 - Summary of Soil Analytical Results, Volatile Organic Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	S1301	S1302	S1303	S1304	B1301	B1302	B1303	B1304	B1306	B1307	B1308	B1309 (4/23)
Methylene Chloride	**0.011BJ**	**0.006BJ**	**0.02B**	**0.023B**	**0.066B**	**0.008BJ**	**0.015B**	**0.022B**	**0.047B**	**0.01BJ**	**0.01BJ**	**0.007BJ**
Acetone	**0.052B**	**0.17B**	**0.068B**	**0.16B**	**0.11B**	**0.017B**	**0.045B**	**0.07B**	**0.043B**	**0.11B**	**0.01BJ**	**0.019B**
Carbon Disulfide	0.012U	0.012U	0.012U	0.012U	**0.002J**	0.012U	0.012U	0.012U	0.011U	0.015U	0.012U	0.013U
2-Butone	0.012U	0.012U	0.012U	0.012U	0.012U	0.012U	0.012U	0.012U	0.011U	**0.031**	0.012U	0.013U
Toluene	0.012U	0.012U	0.012U	0.012U	**0.004J**	0.012U	0.012U	0.012U	0.011U	0.015U	0.012U	0.013U
Total Volatiles	**0.063BJ**	**0.176BJ**	**0.088B**	**0.183B**	**0.182BJ**	**0.025BJ**	**0.06B**	**0.092B**	**0.09B**	**0.151BJ**	**0.02BJ**	**0.026BJ**

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
J = Detected below method detection limit.
U = Not detected.

Table 11. Lot 13 - Summary of Soil Analytical Results, Base-Neutral Extractable Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	B1309 (4/23)
Isophorone	**0.14J**
Naphthalene	**0.06J**
4-Chloroaniline	**6.6**
Acenaphthene	**0.048J**
Dibenzofuran	**0.045J**
Fluorene	**0.057J**
Phenanthrene	**0.46**
Anthracene	**0.085J**
Carbazole	**0.062J**
Di-n-butylphthalate	**0.26J**
Fluoranthene	**0.49**
Pyrene	**0.41J**
Butylbenzylphthalate	**0.7B**
Benzo Anthracene	**0.24J**
Chrysene	**0.29J**
bisphthalate	**0.42BJ**
Benzo(b)fluoranthene	**0.27J**
Benzo(k)fluroanthene	**0.24J**
Benzo Pyrene	**0.21J**
Indeno Pyrene	0.42U
Benzo Perylene	0.42U
Total Base-Neutrals	**11.087BJ**

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
J = Detected below method detection limit.
U = Not detected.

Table 11. Lot 13 - Summary of Soil Analytical Results, Priority Pollutant Metals and Cyanide. FMC; Marcus Hook, Pennsylvania.

Parameter	B1301	B1302	B1303	B1304	B1306	B1309 (4/23)
Aluminum	1,920	8,250	7,980	17,200	4,660	6,450
Antimony	15.7B	15.9	13.5U	12.8U	15.6	14.0U
Arsenic	11.8	75.0	24.3	6.4	44.6	13.8
Barium	188	209	316	44.6B	148	1,780
Beryllium	0.26U	0.40B	0.68B	0.44B	0.63B	0.47B
Cadmium	1.8	1.2U	9.8	1.2U	5.7	2.8
Calcium	3,310	5,990	3,690	435B	12,800	9,280
Chromium	118	36.7	18.3	33.8	47.3	34.0
Cobalt	9.9B	7.4B	14.1	5.8B	7.4B	5.9B
Copper	154	112	562	16.6	1,630	67.8
Iron	74,300	43,900	26,700	30,900	49,100	20,200
Lead	344	348	575	7.1	3,390	251
Magnesium	3,400	3,070	1,700	2,420	2,790	2,680
Manganese	456	212	324	119	334	141
Mercury	20.3	3.3	0.71	0.12U	3.6	7.8
Nickel	197	23.9	225	13.6	49.9	28.6
Potassium	219B	2,500	993B	1,270	1,140	1,030B
Selenium	0.79U	4.7	2.3	0.71U	0.83B	0.78U
Sodium	28,600	1,070B	745B	454B	12,300	438B
Thallium	0.53U	0.54B	0.50U	0.47U	0.43U	0.52U
Vanadium	10.3B	45.2	23.0	49.0	56.4	16.9
Zinc	647	261	963	39.2	7,450	2,080
Cyanide	NA	NA	NA	NA	NA	0.65U

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
U = Not detected.
NA = Not analyzed.

Table 11. Lot 13 - Summary of Soil Analytical Results, PCB, Phenol, pH, Total Petroleum Hydrocarbon, and Asbestos. FMC; Marcus Hook, Pennsylvania.

Parameter	S1301	S1302	S1303	S1304	B1301	B1302	B1303	B1304	B1305	B1306	B1307	B1308	B1309 (4/23)
Total PCBs	<.39	0.16	8.5	<0.02	1.7	60	0.31	NA	1.1	5.8	2.2	63	0.47
Total Phenols	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.10
pH	6.6	6.5	4.7	5.0	ND	NA	6.7	4.8	NA	ND	5.7	NA	NA
TPH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,370	NA
Asbestos													
Chrysotile	ND	<1%	ND	ND	<1%	ND	NA	NA	NA	NA	NA	NA	NA
Amosite	ND	ND	ND	ND	<1%	<1%	NA	NA	NA	NA	NA	NA	NA
Crocidolite	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA
Other	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA
Non-Asbestos													
Cellulose	1-2%	<1%	2-3%	4-5%	<1%	4-5%	NA	NA	NA	NA	NA	NA	NA
Quartz	80-85%	75-80%	80-85%	80-85%	55-60%	75-80%	NA	NA	NA	NA	NA	NA	NA
Calcite	5-6%	5-6%	ND	3-4%	5-8%	ND	NA	NA	NA	NA	NA	NA	NA

Concentrations reported in milligrams per kilogram (mg/kg).
NA = Not analyzed.
ND = Not detected.

Table 12. Lot 14 - Summary of Soil Analytical Results, Volatile Organic Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	S1401	S1402	S1403S	S1404	B1401	B1402	B1403S	B1404	B1405	B1406	B1407S	B1407D
Methylene Chloride	**0.015B**	**0.022B**	**0.015B**	**0.02B**	NA	NA	**0.02B**	NA	**0.005BJ**	**0.009BJ**	**0.006BJ**	**0.007BJ**
Acetone	**0.032B**	**0.079B**	0.012U	**0.048B**	NA	NA	**0.11**	NA	0.012U	0.012U	0.011U	0.012U
Tetrahydrofuran	NA	NA	0.012U	NA	NA	NA	0.012U	NA	0.012U	0.012U	0.012U	0.011U
Total Volatiles	**0.047B**	**0.101B**	**0.015B**	**0.068B**	**NA**	**NA**	**0.13B**	**NA**	**0.005BJ**	**0.009BJ**	**0.006BJ**	**0.007BJ**

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
J = Detected below method detection limit.
U = Not detected.
NA = Not analyzed.

Table 12. Lot 14 - Summary of Soil Analytical Results, Base-Neutral Extractable Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	B1403S	B1405	B1406	B1407S	B1407D
1,2,4 Trichlorobenzene	0.4U	**0.42J**	0.41U	0.36U	0.41U
Naphthalene	0.4U	3.8U	0.41U	**0.17J**	0.41U
2 Methylnaphthalene	0.4U	3.8U	0.41U	**0.12J**	0.41U
Dibenzofuran	0.4U	3.8U	0.41U	**0.058J**	0.41U
Hexachlorobenzene	0.4U	3.8U	0.41U	0.36U	0.41U
Phenanthrene	0.4U	**2.4J**	0.41U	**0.47**	0.41U
Di-n-Butylphthalate	**0.35BJ**	**1.5J**	**0.86B**	**0.52B**	**0.7B**
Fluoranthene	0.4U	**0.45BJ**	0.41U	**0.11J**	0.41U
Butylbenzylphthalate	**0.072BJ**	**1.7J**	0.41U	0.36U	**0.067BJ**
Chrysene	0.4U	**0.79J**	0.41U	**0.14J**	0.41U
Pyrene	0.4U	**1.4J**	0.41U	0.36U	0.41U
Benzo(a)Anthracene	0.4U	**0.85J**	0.41U	0.36U	0.41U
Total Base-Neutrals	**0.422BJ**	**9.51BJ**	**0.86B**	**1.588BJ**	**0.767BJ**

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
J = Detected below method detection limit.
U = Not detected.

Table 12. Lot 14 - Summary of Soil Analytical Results, Priority Pollutant Metals and Cyanide. FMC; Marcus Hook, Pennsylvania.

Parameter	B1403S	B1405	B1406	B1407S	B1407D	B1408
Aluminum	**13,500**	**9,070**	**6,600**	**1,060**	**7,890**	**4,010**
Arsenic	**2.5**	**18.5**	**59.0**	**14.8**	**6.7**	**30.8**
Barium	**65.0**	**131**	**41.2B**	**52.4**	**32.4B**	**50.1**
Beryllium	**0.92B**	**0.60B**	**0.25B**	**0.27B**	0.25U	**0.40B**
Calcium	**945B**	**8,650**	**262B**	**262B**	**120B**	**1,280**
Chromium	**24.9**	**23.9**	**24.5**	**3.7**	**17.1**	**18.5**
Cobalt	**8.9B**	**6.4B**	**3.3B**	2.0U	**4.2B**	**3.6B**
Copper	**12.1**	**62.9**	**13.4**	**21.6**	**9.1**	**26.5**
Iron	**22,400**	**21,500**	**38,400**	**9,600**	**22,600**	**34,100**
Lead	**10.0**	**175**	**8.9**	**10.4**	**9.2**	**13.1**
Magnesium	**2,670**	**3,170**	**1,330**	**42.7B**	**1,730**	**878B**
Manganese	**450**	**185**	**52.9**	**5.1**	**76.8**	**44.4**
Mercury	0.12U	**0.65**	0.12U	**0.17**	0.12U	**0.24**
Nickel	**13.1**	**26.6**	**6.2B**	**3.5B**	**7.8B**	**11.3**
Potassium	**801B**	**1,260**	**1,010B**	635U	707U	**726B**
Selenium	0.74U	0.71U	7.4U	**3.8**	0.74U	**2.2**
Sodium	**575B**	**273B**	**218B**	**142B**	**134B**	**357B**
Vanadium	**36.0**	**68.2**	**35.3**	**6.8B**	**27.8**	**47.6**
Zinc	**60.3**	**185**	**27.7**	**168**	**34.6**	**98.4**
Cyanide	0.62U	0.59U	0.62U	0.55U	0.62U	NA

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
U = Not detected.
NA = Not analyzed.

Table 12. Lot 14 - Summary of Soil Analytical Results, PCB, Phenol, pH, Total Petroleum Hydrocarbon, and Lead. FMC; Marcus Hook, Pennsylvania.

Parameter	S1401	S1402	S1403	S1404	B1401	B1402	B1403S	B1404	B1405	B1406	B1407S	B1407D	B1408
Total PCBs	**0.4**	**15**	**0.049**	<0.02	NA	NA	<0.02	NA	**60**	<0.02	<0.02	<0.02	**0.049**
Total Phenols	NA	NA	NA	NA	NA	NA	<0.10	NA	<0.10	<0.10	<0.10	<0.10	NA
pH	**0.70**	**6.4**	**7.1**	**3.7**	NA	NA	NA	NA	NA	NA	NA	NA	NA
TPH	NA	NA	NA	NA	**280**	**106**	<25	**30.5**	**478**	<25	<25	<25	**73.7**
Lead	NA	NA	NA	NA	NA	NA	**19.1**	NA	NA	NA	**18.9**	**7.9**	NA
Asbestos													
Chrysotile	ND	ND	ND	ND	NA	NA	ND	ND	**1%**	ND	ND	ND	ND
Amosite	ND	ND	ND	ND	NA	NA	ND	ND	**2%**	ND	ND	ND	ND
Crocidolite	ND	ND	ND	ND	NA	NA	ND	ND	ND	ND	ND	ND	ND
Other	ND	ND	ND	ND	NA	NA	ND	ND	ND	ND	ND	ND	ND
Non-Asbestos													
Cellulose	**1-2%**	**2-3%**	**2-3%**	**1-2%**	NA	NA	**1-2%**	**1-2%**	**4-5%**	**2-3%**	**1-2%**	**1-2%**	ND
Quartz	**85-90%**	**85-90%**	**80-85%**	**85-90%**	NA	NA	**80-85%**	**85-90%**	**75-80%**	**80-85%**	**15-20%**	**80-85%**	**65-70%**
Calcite	ND	ND	ND	ND	NA	NA	ND	ND	ND	ND	**5-10%**	ND	**5-10%**

Concentrations reported in milligrams per kilogram (mg/kg).
NA = Not analyzed.

Table 13. Lot 15 - Summary of Soil Analytical Results, Volatile Organic Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	S1501S	S1501D	S1502S	S1503S	B1512
Methylene Chloride	**0.003BJ**	**0.004BJ**	**0.018B**	**0.017BJ**	**0.011B**
Acetone	**0.022B**	0.012U	**0.045**	0.023U	**0.014B**
Tetrahydrofuran	0.012U	0.012U	0.012U	0.023U	NA
Total Volatiles	**0.025BJ**	**0.004BJ**	**0.063B**	**0.017BJ**	**0.025B**

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
J = Detected below method detection limit.
U = Not detected.
NA = Not analyzed.

Table 13. Lot 15 - Summary of Soil Analytical Results, Base-Neutral Extractable Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	S1501S	S1501D	S1502S	S1503S	B1512
Phenanthrene	**0.043J**	0.41U	**0.14J**	0.75U	0.33U
Anthracene	0.4U	0.41U	**0.055J**	0.75U	0.33U
Di-n-Butylphthalate	**0.67B**	**0.43B**	**0.32BJ**	**0.21BJ**	**0.046J**
Fluoranthene	**0.054J**	0.41U	**0.22J**	0.75U	0.33U
Pyrene	**0.043J**	0.41U	**0.14J**	0.75U	0.33U
Butylbenzylphthalate	0.4U	0.41U	0.39U	0.75U	**0.49B**
Benzo(a)Anthracene	0.4U	0.41U	**0.1J**	0.75U	0.33U
bis Phthalate	0.4U	0.41U	0.39U	**2.2**	**0.06J**
Benzo(b)Fluoranthene	0.4U	0.41U	**0.15JX**	0.75U	0.33U
Benzo(k)Fluoranthene	0.4U	0.41U	**0.15JX**	0.75U	0.33U
Chyrsene	0.4U	0.41U	**0.095J**	0.75U	0.33U
Total Base-Neutrals	**0.81J**	**0.43B**	**1.37BJX**	**2.41BJ**	**0.596BJ**

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
J = Detected below method detection limit.
U = Not detected.
X = Other footnotes may be required to properly define results.

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Table 13. Lot 15 - Summary of Soil Analytical Results, Priority Pollutant Metals and Cyanide. FMC; Marcus Hook, Pennsylvania.

Parameter	S1501S	S1501D	S1502S	S1503S	B1512
Aluminum	**10,200**	**9,410**	**12,200**	**15,300**	**355**
Arsenic	**3.7**	**4.8**	**2.7**	**6.3**	**1.3B**
Barium	**49.0**	**51.0**	**56.2**	**65.0B**	**7.8B**
Beryllium	**0.55B**	**0.36B**	**0.50B**	**0.94B**	0.2U
Calcium	**2,190**	**1,090B**	**1,200B**	**7,260**	**155B**
Chromium	**21.7**	**18.4**	**20.7**	**23.5**	**3.1**
Cobalt	**6.8B**	**5.9B**	**6.0B**	4.1U	**2.2B**
Copper	**14.1**	**9.0**	**17.5**	**22.4**	**11.2**
Iron	**16,500**	**16,700**	**17,800**	**4,250**	**1,570**
Lead	**34.2**	**8.3**	**46.1**	**7.8**	**10.8**
Magnesium	**2,030**	**2,430**	**2,300**	**1,270B**	**69.7B**
Manganese	**235**	**217**	**116**	**111**	**6.3**
Mercury	0.12U	0.12U	0.12U	0.23U	**0.14**
Nickel	**10.5**	**13.3**	**12.1**	**10.4B**	**5.0B**
Potassium	698U	**820B**	**919B**	1,320U	579U
Sodium	**1,650**	**406B**	**604B**	**1,570B**	**102B**
Vanadium	**25.4**	**20.3**	**28.6**	**25.0**	**7.0B**
Zinc	**53.4**	**36.2**	**70.3**	**22.0**	**12.0**
Cyanide	0.61U	0.62U	0.60U	1.1U	0.51U

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
U = Not detected.

Table 13. Lot 15 - Summary of Soil Analytical Results, PCB, Phenol, Total Petroleum Hydrocarbon, pH, and Lead. FMC; Marcus Hook, Pennsylvania.

Parameter	S1501S	S1501D	S1502S	S1503S	S1504S	S1505S	S1505D	S1506S	S1506D	S1507S
Total PCBs	<0.02	<0.02	<0.02	<0.02	**87**	**0.9**	**1.4**	**2.1**	<0.02	**8.1**
Total Phenols	**0.21**	<0.10	<0.10	**1.74**	NA	NA	NA	NA	NA	NA
TPH	**59**	<25	**106**	**7,900**	**7,300**	**340**	**698**	**1,320**	<25	**1,540**
pH	**9.8**	**8.4**	**8.7**	**6.7**	**7.8**	**8.3**	**10.1**	**8.2**	**6.3**	**8.5**
Lead	**18.5**	**15.4**	**77.4**	**6.1**	**4,210**	NA	**562**	NA	**10.5**	NA

Concentrations reported in milligrams per kilogram (mg/kg).
NA = Not analyzed.

Table 13. Lot 15 - Summary of Soil Analytical Results, PCB, Phenol, Total Petroleum Hydrocarbon, pH, and Lead. FMC; Marcus Hook, Pennsylvania.

Parameter	S1507D	S1508S	S1508D	S1509S	S1509D	S1510S	S1510D	S1511S	S1511D	B1512
Total PCBs	**27**	**0.39**	<0.02	**7.6**	<0.02	**1.1**	**0.22**	**0.69**	<0.02	**0.14**
Total Phenols	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.10
TPH	**7,130**	**157**	<25	**1,810**	<25	**265**	**596**	**508**	<25	NA
pH	**8.9**	**8.2**	**7.6**	**8.5**	**6.5**	**8.3**	**5.9**	**7.2**	**3.9**	NA
Lead	**5,580**	NA	**9.2**	NA	**5.6**	NA	**153**	NA	**7.3**	NA

Concentrations reported in milligrams per kilogram (mg/kg).
NA = Not analyzed.

Table 14. Lot 17 - Summary of Soil Analytical Results, Volatile Organic Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	B1513	S1701S	S1701D	S1702D	S1709D
Methylene Chloride	**0.018B**	**0.013B**	**0.019B**	**0.077B**	**0.015B**
Acetone	**0.014B**	0.012U	0.012U	**0.11B**	**0.069B**
1,1-Dichloroethane	0.011U	0.012U	0.012U	**0.002J**	0.013U
Chloroform	0.011U	0.012U	0.012U	**0.002J**	0.013U
1,2-Dichloroethane	0.011U	0.012U	0.012U	**0.003J**	0.013U
2-Butone	0.011U	0.012U	0.012U	**0.013**	0.013U
1,1,1-Trichloroethane	0.011U	0.012U	0.012U	**0.008J**	0.013U
Trichloroethene	0.011U	0.012U	0.012U	**0.015**	0.013U
Tetrachloroethene	0.011U	0.012U	0.012U	**0.007J**	0.013U
Tetrahydrofuran	NA	0.012U	0.012U	**NA**	0.013U
Total Volatiles	**0.032B**	**0.019B**	**0.013B**	**0.237J**	**0.084B**

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
J = Detected below method detection limit.
U = Not detected.
NA = Not analyzed.

Table 14. Lot 17 - Summary of Soil Analytical Results, Base-Neutral Extractable Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	B1513	S1701S	S1701D
Naphthalene	1.1U	**0.12J**	0.4U
2-Methylnaphthalene	1.1U	**0.069J**	0.4U
Acenaphthene	1.1U	**0.058J**	0.4U
Dibenzofuran	1.1U	**0.099J**	0.4U
Fluorene	1.1U	**0.096J**	0.4U
Phenanthrene	**0.15J**	**0.63**	**0.16J**
Anthracene	1.1U	**0.25J**	**0.074J**
Carbazole	1.1U	**0.1J**	0.4U
Fluoranthene	**0.21J**	**0.78**	**0.23J**
Pyrene	**0.22J**	**0.58**	**0.15J**
Butylbenzylphthalate	1.1U	**0.15BJ**	**0.15BJ**
Benzo(a)Anthracene	1.1U	**0.47**	**0.13J**
Chrysene	1.1U	**0.57**	**0.16J**
Benzo(b)Fluoranthene	1.1U	**1.1X**	**0.31JX**
Benzo(k)Fluoranthene	1.1U	**1.1X**	**0.31JX**
Benzo(a)Pyrene	1.1U	**0.41**	**0.12J**
IndenoPyrene	1.1U	**0.3J**	**0.062J**
Dibenz Anthracene	1.1U	**0.089J**	0.4U
Benzo Perylene	1.1U	**0.31J**	**0.063J**
Total Base-Neutrals	**0.81J**	**7.281BJX**	**1.919BJX**

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
J = Detected below method detection limit.
U = Not detected.
X = Other footnotes may be required to properly define results.

Table 14. Lot 17 - Summary of Soil Analytical Results, Priority Pollutant Metals and Cyanide. FMC; Marcus Hook, Pennsylvania.

Parameter	B1513
Aluminum	**877**
Arsenic	0.65U
Barium	**14.5B**
Beryllium	0.22U
Calcium	**920B**
Chromium	**8.2**
Cobalt	1.9U
Copper	**159**
Iron	**3,770**
Lead	**163**
Magnesium	**526B**
Manganese	**24.1**
Mercury	0.11U
Nickel	**3.7B**
Potassium	619U
Sodium	**90.8B**
Vanadium	**4.0B**
Zinc	**87.8**
Cyanide	**0.54U**

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
U = Not detected.

Table 14. Lot 17 - Summary of Soil Analytical Results, PCB, Phenol, Total Petroleum Hydrocarbon, pH, Lead, and Cyanide. FMC; Marcus Hook, Pennsylvania.

Parameter	B1513	S1701S	S1701D	S1702S	S1702D	S1703S	S1703D	S1704S	S1704D	S1705S
Total PCB	**20**	**0.022**	<0.02	**0.32**	<0.02	**400**	<0.02	**0.041**	<0.02	**14**
Total Phenol	**0.14**	**0.13**	<0.10	NA	NA	NA	NA	NA	NA	NA
TPH	NA	**500**	<25	<25	<25	<25	<25	**35**	<25	**2,590**
pH	NA	**8.5**	**7.9**	**7.5**	**8.9**	**7.9**	**7.7**	**7.6**	**6.4**	**7.0**
Lead	NA	**710**	**9.4**	NA	**4.2**	NA	**7.6**	NA	**94.0**	NA
Cyanide	NA	0.62U	0.54U	NA	NA	NA	NA	NA	NA	NA

Concentrations reported in milligrams per kilogram (mg/kg).
NA = Not analyzed.

Table 14. Lot 17 - Summary of Soil Analytical Results, PCB, Phenol, Total Petroleum Hydrocarbon, pH, Lead, and Cyanide. FMC; Marcus Hook, Pennsylvania.

Parameter	S1705D	S1706S	S1706D	S1707S	S1707D	S1708S	S1708D	S1709S	S1709D
Total PCB	<0.02	**4.5**	<0.02	**0.2**	<0.02	**0.034**	<0.02	**4.4**	**0.037**
Total Phenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
TPH	<25	**764**	<25	**6,070**	<25	**67**	<25	**1,390**	**1,360**
pH	**7.3**	**8.1**	**7.0**	**7.5**	**4.4**	**9.8**	**9.2**	**10**	**9.9**
Lead	**6.6**	NA	**6.4**	NA	**6.7**	NA	**4.0**	NA	**133**
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA	NA

Concentrations reported in milligrams per kilogram (mg/kg).
NA = Not analyzed.

Table 15. Lot 20 - Summary of Soil Analytical Results, Volatile Organic Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	S2001S	S2001D	S2002	B2001	B2004	B2005S	B2005D	B2007
Methylene Chloride	**0.019B**	**0.14B**	**0.015B**	**0.021B**	**0.015**	**0.022B**	**0.02B**	**0.026B**
Acetone	**0.097B**	**0.49B**	**0.043B**	**0.034B**	**0.018B**	**0.033B**	**0.017B**	**0.014B**
Benzene	0.012U	**0.043B**	0.012U	0.012U	0.011U	0.012U	0.012U	0.01U
Toluene	0.012U	0.067U	0.012U	0.012U	0.011U	0.012U	0.012U	**0.021**
Chlorobenzene	**0.012**	**0.65**	0.012U	0.012U	0.011U	0.012U	0.012U	0.01U
Total Xylenes	**0.003J**	0.067U	0.012U	0.012U	0.011U	0.012U	0.012U	0.01U
Tetrahydrofuran	**0.012U**	NA	NA	NA	NA	NA	NA	NA
Total Volatiles	**0.131BJ**	**1.323BJ**	**0.058B**	**0.055B**	**0.033B**	**0.039B**	**0.053B**	**0.061B**

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
J = Detected below method detection limit.
U = Not detected.
NA = Not analyzed.

Table 15. Lot 20 - Summary of Soil Analytical Results, Base-Neutral Extractable Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	S2001D
1,3-Dichlorobenzene	**1.2**
1,4-Dichlorobenzene	**5.9E**
1,2-Dichlorobenzene	**4.9E**
1,2,4-Trichlorobenzene	**110E**
Hexachlorobenzene	**1.3**
Total Base-Neutrals	**123.3E**

Concentrations reported in milligrams per kilogram (mg/kg).
E = Compound concentrations exceed the calibration for the GC/MS instrument.

Table 15. Lot 20 - Summary of Soil Analytical Results, Priority Pollutant Metals. FMC; Marcus Hook, Pennsylvania.

Parameter	S2001D	S2002	B2001	B2005S	B2005D
Aluminum	13,800	7,530	18,900	8,050	14,300
Arsenic	13.3	0.92U	4.9	121	5.0
Barium	34.7B	29.1B	71.6	114	55.1
Beryllium	0.66B	0.46U	0.86B	2.2	0.56B
Calcium	773B	493B	1,440	6,190	418B
Chromium	23.5	13.8	33.5	34.0	24.9
Cobalt	8.8B	4.6B	7.7B	6.2B	5.6B
Copper	10.4	8.6	20.1	95.8	12.5
Iron	43,100	10,100	25,600	26,400	23,500
Lead	5.5	3.8	18.0	106	7.7
Magnesium	2,760	2,100	2,920	1,670	2,960
Manganese	149	129	183	193	166
Mercury	0.13U	0.12U	0.12U	0.24	0.12U
Nickel	17.6	8.2B	20.4	19.8	11.5
Potassium	1,260B	1,290	1,560	1,190	1,340
Selenium	0.76U	0.69U	0.72U	1.7	0.70U
Sodium	1,030B	183B	191B	258B	144B
Vanadium	27.0	16.6	41.6	54.2	36.7
Zinc	55.8	36.2	103	474	39.2
Cyanide	0.67U	0.61U	0.61U	0.59	0.60U

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
U = Not detected.

Table 15. Lot 20 - Summary of Soil Analytical Results, PCB, Total Petroleum Hydrocarbon, pH, and Asbestos. FMC; Marcus Hook, Pennsylvania.

Parameter	S2001S	S2001D	S2002	B2001	B2003	B2004	B2005S	B2005D	B2007
Total PCBs	NA	**430**	<0.02	<0.02	**0.18**	**0.61**	<0.02	<0.02	**0.206**
TPH	**637**	**46**	NA	<25	NA	NA	**1,330**	<25	**54,900**
pH	NA	**8.2**	**6.5**	**7.1**	NA	**7.2**	NA	NA	NA
Asbestos									
Chrysotile	NA	ND	ND	NA	NA	**30-35%**	NA	NA	NA
Amosite	NA	ND	ND	NA	NA	**25-30%**	NA	NA	NA
Crocidolite	NA	ND	ND	NA	NA	ND	NA	NA	NA
Other	NA	ND	ND	NA	NA	ND	NA	NA	NA
Non-Asbestos									
Cellulose	NA	**2-3%**	**<1%**	NA	NA	ND	NA	NA	NA
Quartz	NA	**75-80%**	**85-90%**	NA	NA	**10-15%**	NA	NA	NA
Calcite	NA	ND	**2-3%**	NA	NA	ND	NA	NA	NA

Concentrations reported in milligrams per kilogram (mg/kg).
NA = Not analyzed.
ND = Not detected.

Table 16. Lot 21 - Summary of Soil Analytical Results, Volatile Organic Compounds. FMC; Marcus Hook, Pennsylvania.

Parameters	S2101	S2102	S2103	S2104	S2105	S2106	S2107	S2108
Methylene Chloride	**0.018B**	**0.038B**	**0.021B**	**0.021B**	**0.046B**	**0.02B**	**0.024B**	**0.016B**
Acetone	**0.027B**	**0.049B**	**0.034B**	**0.12B**	**0.13B**	**0.026B**	**0.024B**	**0.076B**
Total Volatiles	**0.045B**	**0.087B**	**0.055B**	**0.141B**	**0.176B**	**0.046B**	**0.048B**	**0.092B**

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.

Table 16. *Lot 21 - Summary of Soil Analytical Results, Priority Pollutant Metals. FMC; Marcus Hook, Pennsylvania.*

Parameter	S2101	S2102	S2103	S2104	S2105	S2106	S2107	S2108
Aluminum	10,500	14,200	5,970	8,680	10,700	7,940	5,830	11,700
Arsenic	11.7	76.5	33.8	16.3	12.0	12.6	15.1	11.9
Barium	137	175	78.3	92.3	192	112	169	126
Beryllium	1.2	0.77B	0.50B	0.62B	0.79B	0.69B	1.0B	0.63B
Cadmium	1.2U	1.2U	1.3U	1.2U	1.5	1.2U	2.8	1.2U
Calcium	76,500	8,460	4,260	7,980	117,000	4,960	60,700	4,890
Chromium	64.7	58.1	14.4	23.1	63.6	24.0	36.7	24.9
Cobalt	12.4	9.1B	6.6B	7.3B	8.5B	15.2	7.4B	7.6B
Copper	152	470	51.4	82.5	124	97.7	275	196
Iron	33,100	29,200	27,100	25,900	18,000	17,200	18,700	21,200
Lead	88.1	339	129	182	210	146	1,640	229
Magnesium	9,520	4,180	1,550	2,820	17,300	3,100	22,600	2,930
Manganese	706	336	265	256	440	268	348	309
Mercury	9.6	0.38	9.5	0.21	0.40	0.45	1.6	0.63
Nickel	54.5	32.6	10.4	19.1	62.1	31.0	69.3	54.4
Potassium	1,430	1,710	731U	880B	1,190	1,370	739U	1,400
Selenium	0.72U	0.72U	0.79B	0.74U	0.76B	0.70U	0.77U	0.70U
Sodium	537B	348B	203B	268B	416B	170B	323B	311B
Vanadium	24.7	43.6	22.9	25.2	19.5	33.5	473	53.0
Zinc	696	431	163	335	562	297	688	365

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
U = Not detected.

Table 16. Lot 21 - Summary of Soil Analytical Results, PCB, pH, and Asbestos. FMC; Marcus Hook, Pennsylvania.

Parameter	S2101	S2102	S2103	S2104	S2105	S2106	S2107	S2108
Total PCBs	**1.1**	**2.7**	**2.9**	**0.11**	**2.4**	**0.16**	**0.48**	**0.72**
pH	**9.1**	**8.5**	**8.1**	**8.2**	**7.1**	**6.9**	**7.3**	**7.6**
Asbestos								
Chrysotile	**1-2%**	**1-2%**	1%	1-2%	3-5%	<1%	ND	<1%
Amosite	**1-2%**	**<1%**	ND	2-3%	<1%	ND	ND	ND
Crocidolite	ND	ND	ND	ND	ND	ND	ND	ND
Other	ND	ND	ND	ND	ND	ND	ND	ND
Non-Asbestos								
Cellulose	**6-8%**	**3-4%**	5-6%	5-6%	5-6%	3-4%	4-5%	3-4%
Fibrous Glass	**2-3%**	**3-5%**	1-2%	ND	ND	ND	ND	ND
Quartz	**75-80%**	**75-80%**	75-80%	75-80%	70-75%	85-90%	75-80%	70-75%
Calcite	ND	ND	ND	ND	ND	ND	5-10%	10-15%

Concentrations reported in milligrams per kilogram (mg/kg).
ND = Not detected.

Table 17. Lot 22 - Summary of Soil Analytical Results, Base-Neutral Extractable Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	B2202	B2204
bis phthalate	**0.17J**	0.38U
Total Base-Neutrals	**0.17J**	0.38U

Concentrations recorded in milligrams per kilogram (mg/kg).
J = Detected below method detection limit.
U = Not detected.

Table 17. Lot 22 - Summary of Soil Analytical Results, Priority Pollutant Metals and Cyanide. FMC; Marcus Hook, Pennsylvania.

Parameter	S2201	S2202	S2203S	S2204	S2205	S2206	S2207	S2208	S2209	S2210	B2202	B2204
Aluminum	13,700	8,410	6,810	12,300	7,950	14,200	8,580	13,100	10,700	23,000	15,400	13,000
Arsenic	5.3	13.6	14.4	40.5	6.3	92.6	9.6	11.4	7.9	142	4.9	3.5
Barium	121	78.1	97.6	97.5	89.3	99.2	182	90.2	119	183	62.6	54.5
Beryllium	0.67B	0.54B	0.51B	0.72B	0.56B	0.79B	0.60B	0.77B	0.43B	2.2	0.60B	0.58B
Cadmium	1.2U	1.1U	1.1U	1.2U	1.1U	1.2U	1.2U	1.2U	1.1U	1.3	1.2U	1.2U
Calcium	29,900	4,410	3,660	4,590	17,500	3,540	36,000	6,140	9,770	54,700	1,510	812B
Chromium	34.8	19.4	18.2	27.2	18.5	28.4	11.9	26.8	81.2	42.5	24.4	23.1
Cobalt	8.8B	5.5B	6.2B	7.8B	5.0B	9.3B	4.9B	6.7B	7.6B	6.7B	6.8B	6.5B
Copper	58.2	40.3	104	42.7	34.1	52.9	28.4	26.1	50.2	39.8	13.0	8.0
Iron	29,900	17,600	15,400	24,900	19,400	22,800	14,500	23,100	19,900	20,600	22,100	18,200
Lead	80.1	714	485	111	72.5	310	54.1	52.4	94.8	196	25.8	12.4
Magnesium	4,690	1,950	2,800	2,760	6,630	2,910	8,750	2,340	5,050	11,700	3,470	2,060
Manganese	355	169	167	215	263	240	338	177	222	999	211	271
Mercury	2.9	1.0	0.44	0.39	0.13	0.29	0.55	0.12U	0.15	0.47	0.12U	0.12U
Nickel	25.9	16.7	28.9	21.6	16.0	29.2	9.8	21.2	34.0	22.1	10.8	12.0
Potassium	1,480	996B	1,090B	1,360	1,320	1,660	1,340	1,300	2,690	2,060	711B	851B
Sodium	447B	242B	189B	185B	250B	218B	255B	158B	262B	1,060B	240B	194B
Vanadium	34.7	25.4	32.4	35.5	17.1	43.5	18.4	33.7	28.1	37.3	33.5	28.2
Zinc	359	148	261	469	110	241	112	95.3	152	218	50.8	42.2
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.60U	0.58U

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
U = Not detected.
NA = Not analyzed.

Table 17. Lot 22 - Summary of Soil Analytical Results, PCB, pH, Phenol, and Asbestos. FMC; Marcus Hook, Pennsylvania.

Parameter	S2201	S2202	S2203S	S2203D	S2204	S2205	S2206	S2207	S2208	S2209	S2210	B2202	B2204
Total PCBs	**1.6**	**0.23**	**0.17**	NA	<0.02	<0.02	**0.13**	**0.12**	**0.065**	**0.12**	**0.09**	**0.15**	<0.02
pH	**8.3**	**8.1**	**7.5**	**7.5**	**7.9**	**9.0**	**7.3**	**7.9**	**8.2**	**8.1**	**8.3**	NA	NA
Total Phenols	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.64**	<0.10
Asbestos													
Chrysotile	**<1%**	**<1%**	<1%	NA	ND	ND	**<1%**	ND	ND	**<1%**	**<1%**	NA	NA
Amosite	**1-2%**	**<1%**	ND	NA	**<1%**	ND	**<1%**	ND	ND	ND	**<1%**	NA	NA
Crocidolite	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	NA	NA
Other	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	NA	NA
Non-Asbestos													
Cellulose	**3-5%**	**3-5%**	2-3%	NA	**5-6%**	**2-3%**	**2-3%**	**5-6%**	**2-3%**	**5-6%**	**1-2%**	NA	NA
Fibrous Glass	ND	ND	ND	NA	ND	**4-6%**	ND	ND	ND	ND	ND	NA	NA
Quartz	**70-75%**	**80-85%**	75-80%	NA	**80-85%**	**80-85%**	**80-85%**	**80-85%**	**80-85%**	**65-70%**	**75-80%**	NA	NA
Calcite	**10-15%**	ND	5-10%	NA	ND	**2-3%**	ND	ND	**5-10%**	**10-15%**	**5-6%**	NA	NA
Pumice	ND	**2-3%**	ND	NA	**3-5%**	ND	ND	**2-3%**	ND	ND	ND	NA	NA
Mica	ND	ND	ND	NA	ND	ND	**2-3%**	ND	ND	ND	ND	NA	NA

Concentrations reported in milligrams per kilogram (mg/kg).
NA = Not analyzed.
ND = Not detected.

Table 18. Duplicate Samples - Summary of Soil and Aqueous Analytical Results, Volatile Organic Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	April 9, 1992[a]	April 29, 1992[b]	May 1, 1992[c]	May 11, 1992[d]
Methylene Chloride	**1BJ**	**0.019B**	**0.007BJ**	**0.028B**
Acetone	10U	**0.11**	**0.041B**	**0.12B**
1,1-Dichloroethane	10U	0.011U	**0.002J**	0.012U
1,2-Dichloroethane	10U	0.011U	**0.007J**	0.012U
1,1,1-Trichloroethane	10U	0.011U	**0.003J**	0.012U
Total Volatiles	**1BJ**	**0.129B**	**0.06J**	**0.148B**

[a]Duplicate sample of MW-3. Concentrations reported in micrograms per liter ($\mu g/\ell$).
[b]Duplicate sample of S1201. Concentrations reported in milligrams per kilogram (mg/kg).
[c]Duplicate sample of S1301. Concentrations reported in milligrams per kilogram (mg/kg).
[d]Duplicate sample of S2210. Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
J = Detected below method detection limit.
U = Not detected.

ORIGINAL (red)

Table 18. Duplicate Samples - Summary of Aqueous Analytical Results, Base-Neutral Extractable Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	April 9, 1992[a]
Pentachlorophenol	**1BJ**
bis Phthalate	**150BE**
Total Base-Neutrals	**151BEJ**

[a]Duplicate sample of MW-3. Concentrations reported in micrograms per liter ($\mu g/\ell$).
B = Detected in associated blank.
E = Compound whose concentration exceeds the calibration range of the GC/MS instrument.
J = Detected below method detection limit.

Table 18. Duplicate Samples - Summary of Soil and Aqueous Analytical Results, Priority Pollutant Metals and Cyanide. FMC; Marcus Hook, Pennsylvania.

Parameter	April 9, 1992[a][c]	April 9, 1992[b][c]	April 29, 1992[d]	May 11, 1992[e]
Aluminum	**88.8B**	**72,900**	**14,400**	**16,600**
Arsenic	3.0U	3.0U	**2.3B**	**38.6**
Barium	**124B**	**1,190**	**37.9B**	**115**
Beryllium	1.0U	**1.6B**	**0.44B**	**0.88B**
Calcium	**37,200**	**48,500**	**812B**	**6,350**
Chromium	7.0U	**247**	**30.6**	**34.8**
Cobalt	9.0U	**63.0**	2.1U	**9.4B**
Copper	9.0U	**59.6**	**9.3**	**55.9**
Iron	**22,700**	**113,000**	**8,580**	**25,600**
Lead	2.0U	**33.1**	**5.5**	**105**
Magnesium	**17,900**	**63,600**	**955B**	**4,420**
Manganese	**1,860**	**3,000**	**40.9**	**341**
Mercury	0.20U	0.20U	0.12U	**0.35**
Nickel	12.0U	**132**	**8.0B**	**30.1**
Potassium	**16,500**	**52,900**	661U	**2,230**
Sodium	**43,800**	**51,600**	**156B**	**275B**
Vanadium	7.0U	**204**	**34.3**	**40.9**
Zinc	**7.3B**	**182**	**32.2**	**251**
Cyanide	ND	10.0U	NA	NA

[a]Filtered in the field.
[b]Not filtered in the field.
[c]Duplicate sample of MW-3. Concentrations reported in micrograms per liter ($\mu g/\ell$).
[d]Duplicate sample of S1201. Concentrations reported in micrograms per kilogram (mg/kg).
[e]Duplicate sample of S2210. Concentrations reported in micrograms per kilogram (mg/kg).
B = Detected in associated blank.
U = Not detected.
NA = Not analyzed.

Table 18. Duplicate Samples - Summary of Soil Analytical Results, PCB, Phenol, Total Petroleum Hydrocarbon, Lead, pH, and Asbestos. FMC; Marcus Hook, Pennsylvania.

Parameter	April 24, 1992[a]	April 29, 1992[b]	May 1, 1992[c]	May 6, 1992[d]	May 11, 1992[e]
Total PCBs	NA	<0.02	**0.7**	<0.02	**0.07**
Total Phenols	NA	NA	NA	NA	NA
TPH	**44.6**	NA	NA	<25	NA
Lead	NA	NA	NA	**8.4**	NA
pH	NA	**4.9**	**6.0**	**4.6**	**8.0**
Asbestos					
Chrysotile	NA	ND	ND	NA	**<1%**
Amosite	NA	ND	ND	NA	**<1%**
Crocidolite	NA	ND	ND	NA	ND
Other	NA	ND	ND	NA	ND
Non-Asbestos					
Cellulose	NA	ND	**1-2%**	NA	**3-5%**
Fibrous Glass	NA	ND	ND	NA	**1-2%**
Quartz	NA	**70-75%**	**80-85%**	NA	**70-75%**
Calcite	NA	**15-20%**	ND	NA	ND
Mica	NA	ND	**<1%**	NA	**2-3%**

Concentrations reported in milligrams per kilogram (mg/kg).
[a]Duplicate Sample of B1404
[b]Duplicate Sample of S1201.
[c]Duplicate Sample of S1301.
[d]Duplicate Sample of S1707D.
[e]Duplicate Sample of S2210.
NA = Not analyzed.

Table 18. Duplicate Samples - Summary of Aqueous Analytical Results, PCB, Phenol, Total Petroleum Hydrocarbons, Lead, pH, and Asbestos. FMC; Marcus Hook, Pennsylvania.

Parameter	April 9, 1992[c]
Total PCBs[a]	<0.50
Total Phenols[a]	<0.010
TPH[b]	NA
Lead[a]	NA
pH	NA
Asbestos	
Chrysotile	NA
Amosite	NA
Crocidolite	NA
Other	NA
Non-Asbestos	
Cellulose	NA
Fibrous Glass	NA
Quartz	NA
Calcite	NA
Mica	NA

[a]Concentrations reported in micrograms per liter ($\mu g/\ell$).
[b]Concentrations reported in milligrams per liter (mg/ℓ).
[c]Duplicate sample of MW-3.
NA = Not analyzed.

Table 19. Field and Trip Blank Samples - Summary of Aqueous Analytical Results, Volatile Organic Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	FB031692	TB031692	FB031792	TB031792	FB031892	TB031892	FB032092	TB032092
Methylene Chloride	**3BJ**	**2BJ**	**10B**	**6BJ**	**4BJ**	**4BJ**	**16B**	**2BJ**
Acetone	10U	10U	10U	10U	10U	10U	10U	10U
Carbon Disulfide	10U	10U	**2J**	10U	10U	10U	10U	10U
Toluene	10U	10U	10U	10U	10U	10U	**1J**	10U
Ethylbenzene	10U	10U	10U	10U	10U	10U	10U	10U
Total Volatiles	**3BJ**	**2BJ**	**12BJ**	**6BJ**	**4BJ**	**4BJ**	**17BJ**	**2BJ**

Concentrations reported in micrograms per liter ($\mu g/\ell$).
B = Detected in associated blank.
J = Detected below method detection limit.
U = Not detected.
NA = Not analyzed due to bottle breakage during transport.

Table 19. Field and Trip Blank Samples - Summary of Aqueous Analytical Results, Volatile Organic Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	FB032392	TB032392	FB032492	TB032492	FB040992	TB040992	FB041092	TB041092
Methylene Chloride	**1BJ**	**3BJ**	**1BJ**	**1BJ**	**2BJ**	**2BJ**	**1BJ**	**1BJ**
Acetone	10U	10U	**15**	10U	10U	10U	10U	10U
Carbon Disulfide	**16**	10U	10U	10U	10U	10U	10U	10U
Toluene	10U	10U	10U	10U	10U	10U	10U	10U
Ethylbenzene	10U	10U	10U	10U	10U	10U	10U	10U
Total Volatiles	**17BJ**	**3BJ**	**16BJ**	**1BJ**	**2BJ**	**2BJ**	**1BJ**	**1BJ**

Concentrations reported in micrograms per liter ($\mu g/\ell$).
B = Detected in associated blank.
J = Detected below method detection limit.
U = Not detected.
NA = Not analyzed due to bottle breakage during transport.

Table 19. Field and Trip Blank Samples - Summary of Aqueous Analytical Results, Volatile Organic Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	FB041392	TB041392	FB042392	TB042392	FB042492	TB042492	FB042792	TB042792
Methylene Chloride	**2BJ**	NA	10U	10U	10U	10U	**12**	10U
Acetone	10U	NA	10U	10U	10U	10U	10U	10U
Carbon Disulfide	10U	NA	10U	10U	10U	10U	10U	10U
Toluene	10U	NA	10U	10U	10U	10U	10U	10U
Ethylbenzene	10U	NA	10U	10U	10U	10U	**3J**	10U
Total Volatiles	**2BJ**	**NA**	10U	10U	10U	10U	**15J**	10U

Concentrations reported in micrograms per liter ($\mu g/\ell$).
B = Detected in associated blank.
J = Detected below method detection limit.
U = Not detected.
NA = Not analyzed due to bottle breakage during transport.

Table 19. Field and Trip Blank Samples - Summary of Aqueous Analytical Results, Volatile Organic Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	FB042892	TB042892	FB042992	TB042992	FB043092	TB043092	FB050192	TB050192	FB050492
Methylene Chloride	10U	10U	3J	4J	2J	10U	1J	1J	1J
Acetone	10U	10U	10U	10U	10U	10U	11	13	10U
Carbon Disulfide	10U	10U	10U	10U	10U	3J	10U	10U	10U
Toluene	10U	10U	10U	10U	10U	10U	10U	10U	10U
Ethylbenzene	10U	10U	10U	10U	10U	10U	10U	10U	10U
Total Volatiles	10U	10U	3J	4J	2J	3J	12J	14J	1J

Concentrations reported in micrograms per liter ($\mu g/\ell$).
B = Detected in associated blank.
J = Detected below method detection limit.
U = Not detected.
NA = Not analyzed due to bottle breakage during transport.

Table 19. Field and Trip Blank Samples - Summary of Aqueous Analytical Results, Volatile Organic Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	TB050492	FB050592	TB050592	FB050692	TB050692	FB050792	TB050792	FB050892	FB051192
Methylene Chloride	10U	**1J**	**1J**	**2BJ**	**3BJ**	**2BJ**	**1BJ**	**2BJ**	**2J**
Acetone	10U	10U	10U	10U	10U	10U	10U	**10B**	10U
Carbon Disulfide	10U	10U	10U	10U	10U	10U	10U	10U	10U
Toluene	10U	10U	10U	10U	10U	10U	10U	10U	10U
Ethylbenzene	10U	10U	10U	10U	10U	10U	10U	10U	10U
Total Volatiles	10U	**1J**	**1J**	**2BJ**	**3BJ**	**2BJ**	**1BJ**	**12BJ**	**2J**

Concentrations reported in micrograms per liter ($\mu g/\ell$).
B = Detected in associated blank.
J = Detected below method detection limit.
U = Not detected.
NA = Not analyzed due to bottle breakage during transport.

Table 19. Field Blank Samples - Summary of Aqueous Analytical Results, Base-Neutral Extractable Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	FB031692	FB031792	FB031892	FB032092	FB032392	FB032492	FB040992	FB041092	FB041392
Butylbenzylphthalate	10U	**3BJ**	10U	10U	10U	10U	10U	10U	10U
bis Phthalate	10U	10U	10U	**31**	10U	10U	10U	10U	**5J**
Total Base-Neutrals	10U	**3BJ**	10U	31	10U	10U	10U	10U	**5J**

Concentrations reported in micrograms per liter ($\mu g/\ell$).
B = Detected in associated blank.
J = Detected below method detection limit.
U = Not detected.

Table 19. Field Blank Samples - Summary of Aqueous Analytical Results, Base-Neutral Extractable Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	FB042392	FB042492	FB042792	FB042892	FB043092	FB050492	FB050692	FB050792	FB051192
Butylbenzylphthalate	10U	10U	10U	10U	10U	10U	10U	10U	10U
bis Phthalate	**3BJ**	**1BJ**	**2BJ**	10U	**8BJ**	**3BJ**	**69B**	**3BJ**	**1BJ**
Total Base-Neutrals	**3BJ**	**1BJ**	**2BJ**	**10U**	**8BJ**	**3BJ**	**69B**	**3BJ**	**1BJ**

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
J = Detected below method detection limit.
U = Not detected.

Table 19. Field Blank Samples - Summary of Aqueous Analytical Results, Priority Pollutant Metals and Cyanide. FMC; Marcus Hook, Pennsylvania.

Parameter	FB031692	FB031792	FB031892	FB032092	FB032392	FB032492	FB040992
Aluminum	**173B**	**221**	**164B**	**172B**	**134B**	**97.4B**	**118B**
Antimony	60U	60.0U	60.0U	60.0U	60.0U	60.0U	54.OU
Arsenic	3.0U	3.0U	3.0U	3.0U	3.0U	3.0U	3.0U
Barium	7.0U	7.0U	7.0U	**48.1B**	**7.4B**	7.0U	**5.7B**
Beryllium	1.0U	1.0U	1.0U	**1.3B**	1.0U	1.0U	1.0U
Cadmium	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U
Calcium	**54.6B**	**344B**	**147B**	**1,260B**	**240B**	**47.5B**	**50.1B**
Chromium	9.0U	9.0U	9.0U	9.0U	9.0U	9.0U	7.0U
Cobalt	7.0U	7.0U	7.0U	**10.6B**	7.0U	7.0U	9.0U
Copper	5.0U	5.0U	5.0U	**5.7B**	5.0U	5.0U	9.0U
Iron	19.0U	**833**	**93.7B**	**45.2B**	**32.8B**	19.0U	**108**
Lead	2.0U	**2.4B**	**3.7**	2.0U	2.0U	2.0U	**2.7B**
Magnesium	55.0U	**63.8B**	55.0U	**1,210B**	**178B**	55.0U	70.0U
Manganese	2.0U	**5.8B**	2.0U	**4.0B**	2.0U	2.0U	2.0U
Mercury	0.20U	0.20U	0.20U	0.20U	0.20U	0.20U	0.20U
Nickel	13.0U	13.0U	13.0U	13.0U	13.0U	13.0U	12.0U
Potassium	1,770U	1,770U	1,770U	1,770U	1,770U	1,770U	2,870U
Selenium	4.0U	4.0U	4.0U	4.0U	4.0U	4.0U	3.0U
Silver	10.0U	10.0U	10.0U	10.0U	10.0U	10.0U	10.0U
Sodium	**812B**	**1,450B**	**893B**	**1,660B**	**717B**	**388B**	**638B**
Thallium	3.0U	3.0U	3.0U	2.0U	3.0U	3.0U	2.0U
Vanadium	6.0U	6.0U	6.0U	**12.2B**	6.0U	6.0U	7.0U
Zinc	**4.1B**	**11.4B**	**5.6B**	**8.7B**	**8.9B**	**3.8B**	**5.9B**
Cyanide	NA	10.0U	10.0U	10.0U	10.0U	10.0U	10.0U

Concentrations reported in micrograms per liter ($\mu g/\ell$).
B = Detected in associated blank.
U = Not detected.
NA = Not analyzed.

Table 19. Field Blank Samples - Summary of Aqueous Analytical Results, Priority Pollutant Metals and Cyanide. FMC; Marcus Hook, Pennsylvania.

Parameter	FB041092	FB041392	FB042392	FB042492	FB042792	FB042892	FB042992
Aluminum	**101B**	**153B**	**78.4B**	**140B**	**83.6B**	**212**	**107B**
Antimony	54.0U	54.0U	54.0U	54.0U	54.0U	54.0U	54.0U
Arsenic	3.0U	3.0U	3.0U	3.0U	3.0U	3.0U	3.0U
Barium	**4.1B**	**6.2B**	2.0U	2.0U	2.0U	**2.1B**	2.0U
Beryllium	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
Cadmium	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U
Calcium	**35.4B**	**73.7B**	**217B**	**172B**	**148B**	**139B**	**142B**
Chromium	7.0U	7.0U	7.0U	7.0U	7.0U	7.0U	7.0U
Cobalt	9.0U	9.0U	9.0U	9.0U	9.0U	9.0U	9.0U
Copper	9.0U	9.0U	9.0U	9.0U	9.0U	9.0U	9.0U
Iron	**76.5B**	**57.4B**	**404**	**150**	**229**	**211**	**195**
Lead	2.0U	2.0U	**2.2B**	2.0U	2.0U	2.0U	2.0U
Magnesium	70.0U	70.0U	70.0U	70.0U	70.0U	70.0U	70.0U
Manganese	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U
Mercury	0.20U	0.20U	0.20U	0.20U	0.20U	0.20U	0.20U
Nickel	12.0U	12.0U	12.0U	12.0U	12.0U	12.0U	12.0U
Potassium	2,870U	2,870U	2,870U	2,870U	2,870U	2,870U	2,870U
Selenium	3.0U	3.0U	3.0U	3.0U	3.0U	3.0U	3.0U
Silver	10.0U	10.0U	10.0U	10.0U	10.0U	10.0U	10.0U
Sodium	**613B**	**933B**	**394B**	**403B**	334U	**498B**	**360B**
Thallium	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U
Vanadium	7.0U	7.0U	7.0U	7.0U	7.0U	7.0U	7.0U
Zinc	**4.1B**	**6.3B**	**23.7**	**20.5**	**14.4B**	**17.7B**	**9.3B**
Cyanide	10.0U	10.0U	10.0U	10.0U	10.0U	10.0U	NA

Concentrations reported in micrograms per liter ($\mu g/\ell$).
B = Detected in associated blank.
U = Not detected.
NA = Not analyzed.

Table 19. Field Blank Samples - Summary of Aqueous Analytical Results, Priority Pollutant Metals and Cyanide. FMC; Marcus Hook, Pennsylvania.

Parameter	FB043092	FB050192	FB050492	FB050692	FB050792	FB050892	FB051192
Aluminum	57.0U	**59.0B**	**104B**	NA	**132B**	**120B**	**110B**
Antimony	54.0U	54.0U	54.0U	NA	54.0U	54.0U	54.0U
Arsenic	3.0U	3.0U	3.0U	NA	3.0U	3.0U	3.0U
Barium	2.0U	2.0U	2.0U	NA	2.0U	2.0U	2.0U
Beryllium	1.0U	1.0U	1.0U	NA	1.0U	1.0U	1.0U
Cadmium	5.0U	5.0U	5.0U	NA	5.0U	5.0U	5.0U
Calcium	**25.7B**	**47.2B**	**37.4B**	NA	**54.4B**	**47.1B**	**79.1B**
Chromium	7.0U	7.0U	7.0U	NA	7.0U	7.0U	7.0U
Cobalt	9.0U	9.0U	9.0U	NA	9.0U	9.0U	9.0U
Copper	9.0U	9.0U	9.0U	NA	9.0U	9.0U	9.0U
Iron	21.0U	21.0U	21.0U	NA	**28.1B**	21.0U	**25.0B**
Lead	2.0U	2.0U	2.0U	NA	**4.4**	2.0U	**3.2**
Magnesium	70.0U	70.0U	70.0U	NA	70.0U	70.0U	70.0U
Manganese	2.0U	2.0U	2.0U	NA	2.0U	2.0U	2.0U
Mercury	0.20U	0.20U	0.20U	NA	0.20U	0.20U	0.20U
Nickel	12.0U	12.0U	12.0U	NA	12.0U	12.0U	12.0U
Potassium	2,870U	2,870U	2,870U	NA	2,870U	2,870U	2,870U
Selenium	3.0U	3.0U	3.0U	NA	3.0U	3.0U	3.0U
Silver	10.0U	10.0U	10.0U	NA	10.0U	10.0U	10.0U
Sodium	**336B**	334U	**568B**	NA	**531B**	**530B**	**454B**
Thallium	2.0U	2.0U	2.0U	NA	2.0U	2.0U	2.0U
Vanadium	7.0U	7.0U	7.0U	NA	7.0U	7.0U	7.0U
Zinc	3.0U	3.0U	3.0U	NA	**9.2B**	**7.4B**	**8.7B**
Cyanide	10.0U	NA	10.0U	10.0U	NA	NA	10.0U

Concentrations reported in micrograms per liter ($\mu g/\ell$).
B = Detected in associated blank.
U = Not detected.
NA = Not analyzed.

Table 19. Field Blank Samples-Summary of Aqueous Analytical Results, PCB, Phenol, pH, Total Petroleum Hydrocarbon and Lead. FMC; Marcus Hook, Pennsylvania.

Parameter	FB031692	FB031792	FB031892	FB032092	FB032392	FB032492	FB040992	FB041092
Total PCBs[a]	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Phenols[a]	<10	<10	<10	<10	<10	<10	<10	<10
pH	NA	NA	NA	NA	NA	NA	NA	NA
TPH[b]	NA	NA	NA	NA	NA	NA	NA	NA
Lead[a]	NA	NA	NA	NA	NA	NA	NA	NA
Asbestos								
Chrysotile	NA	NA	NA	NA	NA	NA	NA	NA
Non-Asbestos	NA	NA	NA	NA	NA	NA	NA	NA

[a]Concentrations recorded in micrograms per liter ($\mu g/\ell$).
[b]Concentrations recorded in milligrams per liter (mg/ℓ).
NA = Not analyzed.
NR = Not received.
U = Not detected.

Table 19. Field Blank Samples-Summary of Aqueous Analytical Results, PCB, Phenol, pH, Total Petroleum Hydrocarbon and Lead. FMC; Marcus Hook, Pennsylvania.

Parameter	FB041392	FB042392	FB042492	FB042792	FB042892	FB042992	FB043092	FB050192
Total PCBs[a]	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Phenols[a]	<10	<10	NA	<10	<10	NA	<10	NA
pH	NA	NA	NA	NA	**1.91**	**2.20**	**2.04**	**2.08**
TPH[b]	NA	NA	NA	NA	<1.0	NA	<1.0	<1.0
Lead[a]	NA	NA	NA	NA	NA	NA	NA	NA
Asbestos								
Chrysotile	NA	NA	NA	NA	**3**	**1**	ND	ND
Non-Asbestos	NA	NA	NA	NA	**7**	**4**	**3**	**1**

[a]Concentrations recorded in micrograms per liter ($\mu g/\ell$).
[b]Concentrations recorded in milligrams per liter (mg/ℓ).
NA = Not analyzed.
NR = Not received.
U = Not detected.

Table 19. Field Blank Samples-Summary of Aqueous Analytical Results, PCB, Phenol, pH, Total Petroleum Hydrocarbon and Lead. FMC; Marcus Hook, Pennsylvania.

Parameter	FB050492	FB050592	FB050692	FB050792	FB050892	FB051192
Total PCBs[a]	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Phenols[a]	<10	NA	<10	NA	NA	<10
pH	**1.66**	**6.8**	**2.16**	NA	**1.92**	**2.03**
TPH[b]	<1.0	<1.0	<1.0	<1.0	NA	NA
Lead[a]	**0.0058**	0.002U	0.002U	0.002U	NA	NA
Asbestos						
Chrysotile	ND	NA	NA	ND	ND	1
Non-Asbestos	ND	NA	NA	ND	ND	3

[a]Concentrations recorded in micrograms per liter ($\mu g/\ell$).
[b]Concentrations recorded in milligrams per liter (mg/ℓ).
NA = Not analyzed.
ND = Not detected.
U = Not detected.

Table 20. Marcus Hook Creek - Summary of Soil and Aqueous Analytical Results, Volatile Organic Compounds. FMC; Marcus Hook, Pennsylvania.

	Creek Surface Water Samples[a]			Creek Soil Samples[b]			Outfall Water Sample[a]	Outfall Soil Samples[b]		
Parameter	**C101**	**C102**	**C103**	**C201**	**C202**	**C203**	**B1102A**	**B1102**	**B1206**	**B1309**
Methylene Chloride	**2BJ**	10U	**3BJ**	**0.032B**	**0.014B**	**0.021B**	**2BJ**	**0.026B**	**0.014B**	**0.025B**
Acetone	10U	10U	10U	**0.12**	**0.018B**	**0.12**	**76**	**0.054B**	**0.021B**	**0.16**
Carbon Disulfide	10U	10U	10U	0.019U	0.012U	0.015U	10U	0.012U	0.013U	**0.01J**
1,1-Dichloroethene	10U	10U	10U	0.019U	0.012U	0.015U	**2J**	0.012U	0.013U	0.019U
1,1-Dichloroethane	10U	10U	10U	0.019U	0.012U	0.015U	**1J**	0.012U	0.013U	0.019U
1,2-Dichloroethene	**2J**	10U	**3J**	0.019U	0.012U	0.015U	10U	0.012U	0.013U	0.019U
Chloroform	10U	**4J**	10U	0.019U	0.012U	0.015U	10U	0.012U	0.013U	0.019U
2-*Butanone*	**130**	**2,200E**	10U	**0.032**	0.012U	0.015U	10U	0.012U	0.013U	0.019U
Toluene	**1J**	10U	**1J**	0.019U	0.012U	0.015U	10U	0.012U	0.013U	**0.008J**
Chlorobenzene	10U	10U	10U	0.019U	0.012U	0.015U	**14**	**0.016**	0.013U	0.019U
Total Xylenes	**3J**	10U	**4J**	0.019U	0.012U	0.015U	10U	0.012U	0.013U	0.019U
Total Volatiles	**138BJ**	**2,204EJ**	**11BJ**	**0.184B**	**0.032B**	**0.141B**	**95BJ**	**0.096B**	**0.035B**	**0.203BJ**

[a]Concentrations reported in micrograms per liter ($\mu g/\ell$).
[b]Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
E = Compound whose concentration exceeds the calibration range of the GC/MS instrument.
J = Detected below method detection limit.
U = Not detected.

Table 20. Marcus Hook Creek - Summary of Soil and Aqueous Analytical Results, Base-Neutral Extractable Compounds. FMC; Marcus Hook, Pennsylvania.

	Creek Water Samples[a]			Creek Soil Samples[b]			Outfall Water Sample[a]	Outfall Sediment Sample[b]		
Parameter	**C101**	**C102**	**C103**	**C201**	**C202**	**C203**	**B1102A**	**B1102**	**B1206**	**B1309**
1,3-Dichlorobenzene	10U	10U	10U	0.61U	4.1U	0.5U	**5J**	**6.5E**	0.43U	12U
1,4-Dichlorobenzene	10U	10U	10U	0.61U	4.1U	0.5U	**58**	**9.3E**	0.43U	12U
1,2-Dichlorobenzene	10U	10U	10U	0.61U	4.1U	0.5U	**6J**	**0.74**	0.43U	12U
1,2,4-Trichlorobenzene	10U	10U	10U	0.61U	4.1U	0.5U	**68**	**19E**	0.43U	12U
Acenaphthylene	10U	10U	10U	0.61U	4.1U	0.5U	10U	0.4U	**0.043J**	12U
Acenaphthalene	10U	10U	10U	0.61U	4.1U	0.5U	10U	**0.067J**	0.43U	12U
Phenanthrene	10U	10U	10U	0.61U	**1.0J**	0.5U	10U	**0.27J**	**0.051J**	**2.6J**
Anthracene	10U	10U	10U	0.61U	4.1U	0.5U	10U	**0.12J**	**0.078J**	**8.5J**
Di-n-Butylphthalate	10U	10U	10U	0.61U	**0.59J**	0.5U	10U	**0.055J**	**0.05J**	12U
Fluoranthene	10U	10U	10U	0.61U	**1.4J**	0.5U	10U	**0.93**	**0.17J**	**3.3**
Pyrene	10U	10U	10U	0.61U	**0.97J**	0.5U	10U	**0.67**	**0.18J**	**15**
Butylbenzylphthalate	10U	10U	10U	0.61U	**86E**	0.5U	10U	0.4U	**0.13BJ**	12U
Benzo(a)Anthracene	10U	10U	10U	0.61U	**0.67J**	0.5U	10U	**0.37J**	**0.18J**	**3.9J**
Chrysene	10U	10U	10U	0.61U	**0.54J**	0.5U	10U	**0.84**	**0.18J**	**7J**
bis Phthalate	**3BJ**	**2BJ**	**2BJ**	**0.069J**	**3.3J**	0.5U	**16B**	**5.7**	**0.24J**	12U
Benzo(b)Fluoranthene	10U	10U	10U	0.61U	**1.0J**	0.5U	10U	**0.08JX**	**0.74X**	**2.4J**
Benzo(k)Fluoranthene	10U	10U	10U	0.61U	**1.0J**	0.5U	10U	**0.08JX**	**0.74X**	12U
Benzo(a)Pyrene	10U	10U	10U	0.61U	4.1U	0.5U	10U	0.4U	**0.23J**	**2.3J**
Indeno Pyrene	10U	10U	10U	0.61U	4.1U	0.5U	10U	0.4U	**0.46**	**2.1J**
Dibenz Anthracene	10U	10U	10U	0.61U	4.1U	0.5U	10U	0.4U	**0.15J**	12U
Benzo Perylene	10U	10U	10U	0.61U	4.1U	0.5U	10U	0.4U	**0.51**	**3.1J**
Diethylphthalate	10U	10U	10U	0.61U	4.1U	0.5U	**1J**	0.4U	0.43U	12U
Total Base-Neutrals	**3BJ**	**2BJ**	**2BJ**	**0.069J**	**96.47EJ**	0.5U	**154BJ**	**44.722**	**4.132**	**50.2**

[a] Concentrations reported in micrograms per liter ($\mu g/\ell$).
[b] Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
E = Compounds whose concentrations exceed the calibration range of the GC/MS instrument.
J = Detected below method detection limit.
U = Not detected.
X = Other specific footnotes may be required to properly define results.

Table 20. Marcus Hook Creek - Summary of Soil and Aqueous Analytical Results, Priority Pollutant Metals and Cyanide. FMC; Marcus Hook, Pennsylvania.

	Creek Water Samples[a][c]			Creek Water Samples[a][d]			Creek Soil Samples[b][d]			Outfall Water Sample[a]		Outfall Sediment Samples[b]		
Parameter	**C101**	**C102**	**C103**	**C101**	**C102**	**C103**	**C201**	**C202**	**C203**	**B1102A[c]**	**B1102A[d]**	**B1102**	**B1206**	**B1309**
Aluminum	241	116B	193B	882	367	1,040	23.2	12.9	21.9	130B	4,920	9.01	12.9	12.8
Arsenic	3.0U	3.0U	3.0U	3.0U	3.0U	3.0U	0.0094	0.0035	0.0054	3.0U	3.0U	0.0103	0.0034	0.0045
Barium	29.7B	59.6B	38.6B	38.3B	54.3B	48.1B	0.0992	0.144	0.1	84.4B	133B	0.121	0.293	0.262
Beryllium	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	0.0011B	0.0008B	0.0011B	1.0U	1.0U	0.00079B	0.0013U	0.00092B
Cadmium	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	0.0019U	0.0012U	0.0015U	5.0U	5.0U	0.0012U	0.0065U	0.0616
Calcium	18,600	28,800	29,500	19,300	29,900	30,000	3.33	2.11	2.44	193,000	203,000	12.1	1.33B	2.92
Chromium	7.0U	7.0U	7.0U	7.0U	7.0U	7.0U	0.0541	0.0387	0.0536	7.0U	35.8	0.0377	0.0427	0.0489
Cobalt	9.0U	9.0U	9.0U	9.0U	9.0U	9.0U	0.0138B	0.0131	0.0147B	9.0U	9.0U	0.0099B	0.0122B	0.013B
Copper	9.0U	9.0U	11.8B	9.0U	9.0U	12.5B	0.0103	0.027	0.0088	9.0U	34.4	0.0706	0.0336	0.361
Iron	475	33.0B	448	1,200	814	1,660	34.1	21.2	31.8	8,790	17,600	31.5	25.3	33.6
Lead	2.0U	2.0U	2.0U	3.1	2.0U	6.4	0.012	0.0784	0.0222	2.0U	23.7	0.133	0.0472	2.44
Magnesium	6,780	13,000	9,500	7,230	13,700	9,980	8.01	3.83	6.65	54,300	58,100	5.32	5.27B	3.18
Manganese	149	510	127	157	538	144	0.553	0.371	0.419	1,080	1,140	0.527	0.162	0.321
Mercury	0.20U	0.20U	0.20U	0.20U	0.20U	0.20U	0.00019U	0.00014	0.00015U	0.20U	0.23	0.00010	0.00013U	0.0017
Nickel	12.0U	12.0U	12.0U	12.0U	12.0U	12.0U	0.0306	0.022	0.0304	27.0B	28.9B	0.171	0.0232B	0.0483
Potassium	2,870U	3,440B	5,280	2,870U	2,920B	4,780	3.01	1.92	2.2	22,700	24,300	1.05B	4.78B	1.61B
Selenium	3.0U	3.0U	3.0U	3.0U	3.0U	3.0U	0.0011U	0.00075U	0.00091U	3.0U	3.0U	0.00073U	0.00078U	0.0024
Sodium	25,800	18,700	84,300	10.0U	20,100	90,400	0.745B	0.309B	0.593B	203,000	217,000	0.455B	0.614	0.678B
Thallium	2.0U	2.0U	2.0U	27,700	2.0U	2.0U	0.00076U	0.0005U	0.00061U	2.0U	2.0U	0.0007U	0.00064U	0.00068U
Vanadium	7.0U	7.0U	7.0U	7.0U	7.0U	7.0U	0.0535	0.0385	0.0539	7.3B	301	0.36	0.0499B	0.0456
Zinc	19.9B	13.2B	23.9	30.0	17.8B	38.6	0.0936	0.125	0.094	150	265	0.411	0.106	4.62
Cyanide	NA	NA	NA	11.8	10.0U	10.0U	0.00095U	0.00062U	0.00076U	NA	10.0U	0.0006U	0.00065U	0.00093U

[a] Concentrations reported in micrograms per liter ($\mu g/\ell$).
[b] Concentrations reported in milligrams per kilogram (mg/kg).
[c] Filtered in the field.
[d] Not filtered in the field.
B = Detected in associated blank.
U = Not detected.
NA = Not analyzed.

Table 20. Marcus Hook Creek - Summary of Soil and Aqueous Analytical Results, PCBs and Phenol. FMC; Marcus Hook, Pennsylvania.

	Creek Water Samples[a]			Creek Soil Samples[b]			Outfall Water Sample[a]	Outfall Sediment Samples[b]		
Parameter	**C101**	**C102**	**C103**	**C201**	**C202**	**C203**	**B1102A**	**B1102[c]**	**B1206**	**B1309**
Total PCBs	<0.50	<0.50	<0.50	<0.02	<0.02	<0.02	1.7	**54**	**0.11**	**0.11**
Phenols	*<10*	*<10*	*<10*	*<10*	**0.30**	*<0.10*	*<0.01*	**0.56**	*<0.10*	*<0.10*

[a]Concentrations reported in micrograms per liter ($\mu g/\ell$).
[b]Concentrations reported in milligrams per kilogram (mg/kg).
[c]Field sample B1102 collected on April 13, 1992.

Table 21. Summary of Monitoring Well Information. FMC Corporation; Marcus Hook, Pennsylvania.

	Well Construction Details							Surveying Information		
Well	Well Depth	Well Diameter	Casing Interval (depth)	Screened Interval (depth)	Grout Interval (depth)	Bentonite Seal Interval (depth)	Gravel Pack Interval (depth)	Top of Steel Casing Elevation	Top of PVC Elevation	Ground Elevation
MW-1	30.0	4" PVC	0-15.0[2]	15.0-30.0	0-12.0	12.00-13.00	13.0-30.0	23.63	22.03	19.94
MW-2	12.5	4" PVC	0-2.5[3]	2.5-12.5	0-0.5	0.50-1.50	1.5-12.5	17.16	16.78	17.16
MW-3	19.0	4" PVC	0-4.0[2]	4.0-19.0	0-1.0	1.00-2.00	2.0-19.0	18.81	18.28	15.81
MW-4	18.0	4" PVC	0-3.0[2]	3.0-18.0	0-2.0	2.00-2.50	2.5-18.0	30.20	29.40	27.20
MW-5	20.0	4" PVC	0-5.0[3]	5.0-20.0	0-2.0	2.00-3.00	3.0-20.0	32.29	31.98	32.29
MW-6	20.0	4" PVC	0-10.0[2]	10.0-20.0	0-7.0	7.00-8.00	8.0-20.0	24.34	24.10	21.98
B-2[1]	20.0	4" PVC	0-10.0[3]	10.0-20.0	0-6.6	6.60-8.60	8.6-20.0	20.39	19.83	20.50
B-3[1]	22.0	4" PVC	0-12.0[3]	12.0-22.0	0-8.6	8.60-10.60	10.6-22.0	21.08	20.86	21.30
B-4[1]	16.5	4" PVC	0-6.5[3]	6.5-16.5	0-2.3	2.30-4.30	4.3-16.5	23.78	23.51	23.08
B-5[1]	14.0	4" PVC	0-9.0[3]	9.0-14.0	0-6.5	6.50-8.00	8.0-14.0	23.42	23.01	23.55

All measurements are in feet, except where indicated
[1]Existing wells previously installed by others.
[2]Wells finished with above-ground protective casing.
[3]Wells finished with protective casing flush to the ground surface.

Table 22. On-Site Monitoring Wells - Summary of Aqueous Analytical Results, Volatile Organic Compounds. FMC, Marcus Hook, Pennsylvania.

Parameter	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	B-2	B-3	B-4	B-5
Methylene Chloride	**6BJ**	**2BJ**	**6BJ**	10U	10U	**2BJ**	**1BJ**	**1BJ**	**4BJ**	**2BJ**
1,1 Dichloroethene	**4J**	10U	10U	10U	10U	**2J**	**6J**	10U	**9J**	10U
1,1 Dichloroethane	10U	10U	10U	10U	10U	**2J**	**12**	10U	**4J**	10U
1,1,1 Trichloroethane	10U	10U	10U	10U	10U	**12**	**5J**	10U	10U	10U
Trichloroethene	10U	10U	10U	10U	10U	**10**	10U	10U	**26**	10U
Tetrachloroethene	10U	10U	10U	10U	10U	**5J**	10U	10U	**10**	10U
Toluene	10U	10U	**1J**	10U	10U	10U	10U	10U	10U	10U
Total Xylenes	10U	10U	**2J**	10U	10U	10U	10U	10U	10U	10U
Carbon Disulfide	10U	10U	10U	10U	**18**	10U	10U	10U	10U	10U
Chloroform	10U	10U	10U	10U	10U	**3J**	10U	10U	10U	10U
Total Volatiles	**10BJ**	**2BJ**	**9BJ**	10U	**18**	**36BJ**	**24BJ**	**1BJ**	**53BJ**	**2BJ**

Concentrations reported in micrograms per liter ($\mu g/\ell$).
B = Detected in associated blank.
J = Detected below method detection limit.
U = Not detected.

Table 22. On-Site Monitoring Wells - Summary of Aqueous Analytical Results, Base-Neutral Extractable Compounds. FMC; Marcus Hook, Pennsylvania.

Parameter	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	B-2	B-3	B-4	B-5
bis-phthalate	1BJ	2BJ	2BJ	1BJ	73B	7BJ	1BJ	10U	2BJ	180BE
Pentachlorophenol	25U	25U	2BJ	1BJ	25U	25U	25U	1BJ	1BJ	1BJ
2-Methynaphthalene	10U	10U	1J	10U	10U	2J	10U	10U	10U	10U
1,4 Dichlorobenzene	10U	10U	10U	10U	10U	2J	10U	10U	10U	10U
1,2 Dichlorobenzene	10U	10U	10U	10U	10U	1J	10U	10U	10U	10U
1,2,4 Trichlorobenzene	10U	10U	10U	10U	10U	50	10U	10U	10U	10U
Naphthalene	10U	10U	10U	10U	10U	3J	10U	10U	10U	10U
Phenanthrene	10U	10U	10U	10U	10U	3J	10U	10U	10U	10U
Di-n-Butylphthalate	10U	10U	10U	10U	10U	2J	10U	10U	10U	10U
Fluoranthene	10U	10U	10U	10U	10U	2J	10U	10U	10U	10U
Pyrene	10U	10U	10U	10U	10U	3J	10U	10U	10U	10U
Benzo Anthracene	10U	10U	10U	10U	10U	1J	10U	10U	10U	10U
Chrysene	10U	10U	10U	10U	10U	1J	10U	10U	10U	10U
Di-n-Octyl Phethalate	10U	10U	10U	10U	10U	2J	10U	10U	10U	10U
Benzo(b) Fluoranthene	10U	10U	10U	10U	10U	3JX	10U	10U	10U	10U
Benzo(k) Fluoranthene	10U	10U	10U	10U	10U	3JX	10U	10U	10U	10U
Benzo(a) Pyrene	10U	10U	10U	10U	10U	1J	10U	10U	10U	10U
Total Base-Neutrals	**1BJ**	**2BJ**	**5BJ**	**2BJ**	**73B**	**86BJX**	**1BJ**	**1BJ**	**3BJ**	**181BEJ**

Concentrations reported in micrograms per liter ($\mu g/\ell$).
B = Detected in associated blank.
E = Compound whose concentration exceeds the calibration range of the GC/MS instrument.
J = Detected below method detection limit.
U = Not detected.
X = Other footnotes may be required to properly define results.

Table 22. On-Site Monitoring Wells - Summary of Aqueous Analytical Results, Priority Pollutant Metals and Cyanide. FMC; Marcus Hook, Pennsylvania.

Parameter	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	B-2	B-3	B-4	B-5
Aluminum	44,300	6,660	54,800	7,640	20,900	533,000	14,900	63,500	27,000	124,000
Antimony	54.0U	54.0U	54.0U	54.0U	54.0U	114	54.0U	54.0U	54.0U	54.0U
Arsenic	8.5B	12.7	3.9B	8.1B	11.4	15.0U	6.6B	3.2B	12.2	54.1
Barium	211	99.2	931	84.5B	241	1,180	147B	144B	245	598
Beryllium	9.4	1.0U	1.4B	1.0U	1.5B	19.7	1.0B	16.8	1.3B	6.3
Calcium	426,000	226,000	46,100	22,100	86,100	131,000	23,900	184,000	66,800	261,000
Chromium	102	26.8	190	11.2	41.0	1,180	31.5	89.8	56.3	225
Cobalt	1,240	9.0U	49.2B	11.6B	28.1B	422	14.3	430	22.5B	86.1
Copper	43.7	10.2B	46.1	12.2B	39.9	1,080	64.1	285	72.2	664
Iron	203,000	13,000	95,500	8,940	42,500	289,000	32,700	66,300	51,900	540,000
Lead	3.8	4.1	43.4	27.3	24.4	202	96.9	10U	77.8	338
Magnesium	149,000	49,000	52,700	28,100	88,300	327,000	8,190	54,300	20,100	70,400
Manganese	42,300	771	2,810	546	779	20,800	411	19,500	948	2,090
Mercury	0.20U	0.20U	0.20U	0.20U	0.20U	1.9	0.20	0.20U	0.21	2.0
Nickel	826	22.0B	104	21.3B	86.6	1,030	36.6B	485	50.2	264
Potassium	28,700	10,500	44,600	2,870U	7,230	266,000	6,270	6,740	19,300	18,400
Sodium	8,030	174,000	50,200	30,600	235,000	409,000	577,000	163,000	331,000	349,000
Vanadium	52.1	14.6B	155	12.0B	50.4	1,210	177	112	65.6	341
Zinc	985	59.1	146	141	169	2,860	237	2,320	244	1,520
Cyanide	10.0U	10.0U	10.0U	10.0U	10.0U	10.0U	10.0U	10.0U	10.0U	10.0U

Concentrations reported in micrograms per liter ($\mu g/\ell$).
B = Detected in associated blank.
U = Not detected.

Table 22. On-Site Monitoring Wells - Summary of Aqueous Analytical Results, Priority Pollutant Metals. FMC; Marcus Hook, Pennsylvania.

Parameter	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	B-2	B-3	B-4	B-5
Aluminum	**13,100**	**117B**	57.0U	**89.2B**	NA	**356**	**252**	**46,100**	**244**	**111B**
Antimony	54.0U	54.0U	54.0U	54.0U	NA	54.0U	54.0U	54.0U	54.0U	54.0U
Arsenic	3.0U	**7.3B**	3.0U	3.0U	NA	**4.0B**	3.0U	3.0U	**4.2B**	3.0U
Barium	**18.0B**	**50.5B**	**136B**	**19.6B**	NA	**147B**	**28.8B**	**22.7B**	**55.2B**	**22.5B**
Beryllium	**7.9**	1.0U	1.0U	1.0U	NA	1.0U	1.0U	**15.8**	1.0U	1.0U
Calcium	**412,000**	**205,000**	**39,500**	**18,700**	NA	**66,900**	**18,300**	**183,000**	**54,000**	**229,000**
Cobalt	**1,170**	9.0U	9.0U	9.0U	NA	9.0U	9.0U	**422**	9.0U	**23.5B**
Copper	9.0U	9.0U	9.0U	9.0U	NA	9.0U	9.0U	**265**	9.0U	**11.0B**
Iron	**401,000**	**2,950**	**21,000**	**435**	NA	**885**	**2,750**	**34,500**	**206**	**2,890**
Magnesium	**128,000**	**42,900**	**18,000**	**23,500**	NA	**26,800**	**3,670B**	**48,600**	**10,800**	**45,000**
Manganese	**40,500**	**676**	**1,970**	**481**	NA	**4,710**	**319**	**19,700**	**347**	**799**
Mercury	0.20U	0.20U	0.20U	0.20U	NA	0.20U	0.20U	0.20U	0.20U	0.20U
Nickel	**782**	**13.2B**	12.0U	**13.4B**	NA	**22.5B**	**12.3B**	**476**	**12.0U**	**67.4**
Potassium	**23,400**	**8,690**	**18,300**	2,870U	NA	**16,100**	**4,540**	**3,820B**	**12,900**	**7,900**
Sodium	**783,000**	**159,000**	**46,900**	**29,500**	NA	**393,000**	**550,000**	**166,000**	**307,000**	**317,000**
Zinc	**903**	**49.7**	**12.6B**	**99.8**	NA	**13.6B**	**119**	**2,340**	**14.4B**	**177**

Concentrations reported in micrograms per liter ($\mu g/\ell$).
B = Detected in associated blank.
U = Not detected.
NA = Not analyzed due to bottle transportation problem.

Table 22. On-Site Monitoring Wells - Summary of Aqueous Analytical Results, PCB and Phenol. FMC, Marcus Hook, Pennsylvania.

Parameter	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	B-2	B-3	B-4	B-5
Total PCBs	<0.50	<0.50	<0.50	<0.50	<0.50	**28**	<0.50	<0.50	<0.50	**0.62**
Total Phenols	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10

Concentrations reported in micrograms per liter ($\mu g/\ell$).
B = Detected in associated blank.
J = Detected below method detection limit.
U = Not detected.

Table 23. Monitoring Well Samples - Summary of Soil Analytical Results, Volatile Organic Compounds. FMC, Marcus Hook, Pennsylvania.

	MW-1 SS-1	MW-1 SS-9	MW-2 SS-2	MW-2 SS-6	MW-3 SS-1	MW-3 SS-4	MW-4 SS-1	MW-4 SS-3	MW-5 SS-1	MW-5 SS-5	MW-6 SS-1	MW-6 SS-7
Methylene Chloride	**0.056B**	**0.14B**	**0.048B**	**0.046B**	**0.19B**	**0.16B**	**0.024B**	**0.032B**	**0.033B**	**0.043B**	**0.11B**	**0.042B**
Acetone	**0.027**	**0.043**	0.012U	**0.026B**	**0.063B**	**0.04B**	0.013U	0.012U	**0.034**	**0.092B**	**0.056**	**0.072B**
Carbon Disulfide	0.012U	0.013U	**0.003J**	0.012U	0.012U	0.012U	0.013U	0.012U	0.012U	0.012U	0.013U	0.012U
Toluene	0.012U	0.013U	0.012U	0.012U	**0.003J**	0.012U	0.013U	0.012U	0.012U	0.012U	0.013U	**0.002BJ**
Chloroform	0.012U	0.013U	0.012U	0.012U	0.012U	0.012U	0.013U	0.012U	0.012U	0.012U	**0.003J**	0.012U
1,1,1-Trichloroethane	0.012U	0.013U	0.012U	0.012U	0.012U	0.012U	0.013U	0.012U	0.012U	0.012U	0.013U	**0.002J**
Total Volatiles	**0.083B**	**0.183B**	**0.051BJ**	**0.072B**	**0.256BJ**	**0.2B**	**0.024B**	**0.032B**	**0.067B**	**0.135B**	**0.169BJ**	**0.118BJ**

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
J = Detected below method detection limit.
U = Not detected.

Table 23. Monitoring Well Samples - Summary of Soil Analytical Results, Base-Neutral Extractable Compounds. FMC, Marcus Hook, Pennsylvania.

	MW-1 SS-1	MW-1 SS-9	MW-2 SS-2	MW-2 SS-6	MW-3 SS-1	MW-3 SS-4	MW-4 SS-1	MW-4 SS-3	MW-5 SS-1	MW-5 SS-5	MW-6 SS-1	MW-6 SS-7
Naphthalene	**0.075J**	0.42U	0.41U	0.39U	0.39U	0.39U	**0.059J**	0.39U	0.41U	0.41U	**0.59**	0.41U
2-Methylnaphthalene	**0.11J**	0.42U	0.41U	0.39U	0.39U	0.39U	**0.062J**	0.39U	0.41U	0.41U	**0.8**	0.41U
Phenanthrene	**0.15J**	**0.072J**	0.41U	0.39U	**0.13J**	**0.28J**	**1.0**	0.39U	0.41U	0.41U	**1.1**	0.41U
Di-n-Butylphthalate	**0.39BJ**	**0.33BJ**	0.41U	0.39U	0.39U	0.39U	**1.7B**	**1.5B**	**0.11BJ**	**0.11BJ**	**0.29J**	**0.091BJ**
Fluoranthene	**0.096J**	0.42U	0.041U	0.039U	**0.17J**	**0.63**	**1.7**	**0.064J**	0.41U	0.41U	**0.57**	0.41U
Pyrene	**0.071J**	0.42U	**0.046J**	0.39U	**0.15J**	**0.54**	**1.5**	**0.056J**	0.41U	0.41U	**0.32**	0.41U
Butylbenzylphthalate	**0.47B**	**0.65B**	**0.066J**	0.39U	**0.19BJ**	**0.29BJ**	**0.37BJ**	**0.28BJ**	0.41U	0.41U	**1.1B**	0.41U
Benzo(a)Anthracene	**0.077J**	0.42U	0.41U	0.39U	**0.085J**	**0.29J**	**0.81**	0.39U	0.41U	0.41U	**0.32J**	0.41U
Chrysene	**0.11J**	**0.053J**	**0.041J**	0.39U	**0.082J**	**0.24J**	**0.81**	0.39U	0.41U	0.41U	**0.5J**	0.41U
bisPhthalate	**0.17BJ**	**0.2BJ**	**0.05BJ**	0.39U	**0.049J**	**0.064J**	**0.27BJ**	**0.14BJ**	0.41U	0.41U	**0.71B**	**0.12BJ**
Benzo(b)Fluoranthene	**0.12JX**	0.42U	**0.059J**	0.39U	**0.073J**	**0.19J**	**1.2X**	**0.056JX**	0.41U	0.41U	**0.9X**	0.41U
Benzo(k)Fluoranthene	**0.12JX**	0.42U	0.41U	0.39U	**0.069J**	**0.2J**	**1.2X**	**0.056JX**	0.41U	0.41U	**0.9X**	0.41U
Benzo Pyrene	0.4U	0.42U	0.41U	0.39U	**0.078J**	**0.22J**	**0.58**	0.39U	0.41U	0.41U	**0.23J**	0.41U
Anthracene	0.4U	0.42U	0.41U	0.39U	0.39U	**0.098J**	**0.25J**	0.39U	0.41U	0.41U	**0.06J**	0.41U
Indeno Pyrene	0.4U	0.42U	0.41U	0.39U	0.39U	**0.11J**	**0.39J**	0.39U	0.41U	0.41U	**0.33J**	0.41U
Dibenz Anthracene	0.4U	0.42U	0.41U	0.39U	0.39U	**0.048J**	**0.19J**	0.39U	0.41U	0.41U	**0.14J**	0.41U
Benzo Perylene	0.4U	0.42U	0.41U	0.39U	0.39U	**0.073J**	**0.3J**	0.39U	0.41U	0.41U	**0.36J**	0.41U
Acenaphthene	0.4U	0.42U	0.41U	0.39U	0.39U	0.39U	**0.044J**	0.39U	0.41U	0.41U	0.55U	0.41U
Dibenzofuran	0.4U	0.42U	0.41U	0.39U	0.39U	0.39U	**0.071J**	0.39U	0.41U	0.41U	**0.33J**	0.41U
Fluorene	0.4U	0.42U	0.41U	0.39U	0.39U	0.39U	**0.07J**	0.39U	0.41U	0.41U	**0.55J**	0.41U
Carbozole	0.4U	0.42U	0.41U	0.39U	0.39U	0.39U	**0.16J**	0.39U	0.41U	0.41U	0.55U	0.41U
Total Base-Neutrals	**1.959BJX**	**1.305BJ**	**0.262BJ**	0.39U	**1.076BJ**	**3.273BJ**	**12.736BJX**	**2.152BJX**	**0.11BJ**	**0.11BJ**	**10.1BJX**	**0.211BJ**

Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
J = Detected below method detection limit.
U = Not detected.
X = Other specific footnotes may be required to properly define results.

Table 23. Monitoring Well Samples - Summary of Soil Analytical Results, Priority Pollutant Metals and Cyanide[a]. FMC; Marcus Hook, Pennsylvania.

	MW-1 SS-1	MW-1 SS-9	MW-2 SS-2	MW-2 SS-6	MW-3 SS-1	MW-3 SS-4	MW-4 SS-1	MW-4 SS-3	MW-5 SS-1	MW-5 SS-5	MW-6 SS-1	MW-6 SS-7
Aluminum	12.6	17.2	8.09	12.4	14.1	8.03	12	13.5	11.1	9.37	5.18	12
Antimony	0.0105U	0.0112U	0.0107U	0.0102U	0.0141U	0.0153	0.0156U	0.0142U	0.0148U	0.0142U	0.0111U	0.0108U
Arsenic	0.0075	0.0018B	0.0117	0.0036	0.0052	0.0091	0.0497	0.0071U	0.0075U	0.0035	0.0645	0.0035
Barium	0.0466B	0.0713	0.0974	0.0567	0.153	0.118	0.0569	0.0614	0.0454B	0.0318B	0.112	0.031B
Beryllium	0.00078B	0.0011B	0.00049U	0.00069B	0.00073B	0.00097B	0.00068B	0.00066B	0.00069B	0.00053B	0.00053B	0.00087B
Cadmium	0.0012U	0.0013U	0.0012U	0.0013	0.0012U	0.0012U	0.0013U	0.0012U	0.0012U	0.0012U	0.0013U	0.0012U
Calcium	0.87U	1.46	5.73	2.51	2.48	10.5	0.419B	0.938B	1.51	0.586B	4.32	0.897U
Chromium	0.0291	0.066	0.031	0.022	0.0327	0.0233	0.0248	0.0279	0.0206	0.0129	0.0285	0.0128
Cobalt	0.0073B	0.0451	0.0075B	0.0101B	0.0105B	0.0111B	0.0069B	0.0138	0.0098B	0.0063B	0.005B	0.0133
Copper	0.0096	0.0304	0.0369	0.0601	0.0494	0.0438	0.0891	0.0167	0.0106	0.0084	0.0655	0.0081
Iron	34.6	82.4	20.6	21.8	23.5	8.1	22	20.4	17.2	21.9	24.1	8.88
Lead	0.0767	0.0032	0.0373	0.0561	0.177	0.0743	0.0189	0.0084	0.0083	0.014	0.127	0.0049
Magnesium	2.1	10.9	4.79	2.34	3.48	4.71	2.67	3.73	2.75	2.33	2.44	1.26
Manganese	0.269	1.69	0.247	0.243	0.236	0.704	0.163	0.35	0.183	0.166	0.138	0.187
Mercury	0.00012	0.00012U	0.0001U	0.0001U	0.00013	0.00011	0.00011U	0.00011U	0.00011U	0.00011U	0.00076	0.00011U
Nickel	0.0109	0.032	0.0134	0.0257	0.0228	0.0251	0.0127	0.0158	0.0118	0.0114	0.0246	0.0175
Potassium	1.22	1.25B	2.67	0.839B	1.73	2.06	1.26B	1.4	1.0B	0.767B	0.989B	0.779B
Selenium	0.00097U	0.001U	0.00096U	0.00093U	0.00094U	0.0018	0.0514	0.019U	0.0199U	0.0095U	0.001B	0.001U
Sodium	1.63	1.06B	0.44B	0.155B	0.327B	0.352B	0.117B	0.142B	0.278B	0.203B	0.359B	0.317B
Vanadium	0.0362	0.0551	0.0378	0.0302	0.0566	0.0307	0.038	0.0366	0.0325	0.0183	0.0455	0.0098B
Zinc	0.0305	0.0475	0.136	0.844	0.0186	0.105	0.0529	0.0974	0.0376	0.037	0.181	0.0518
Cyanide	0.0006U	0.00064U	0.00062U	0.0006U	0.00059U	0.00059U	0.00065U	0.00061U	0.00063U	0.00062U	0.00064U	0.00062U

[a]Concentrations reported in milligrams per kilogram (mg/kg).
B = Detected in associated blank.
U = Not detected.

Table 23. Monitoring Well Samples - Summary of Soil Analytical Results, PCB and Phenol. FMC; Marcus Hook, Pennsylvania.

	MW-1 SS-1	MW-1 SS-9	MW-2 SS-2	MW-2 SS-6	MW-3 SS-1	MW-3 SS-4	MW-4 SS-1	MW-4 SS-3	MW-5 SS-1	MW-5 SS-5	MW-6 SS-1	MW-6 SS-7
Total PCBs	**1.4**	**0.13**	<0.02	<0.02	**0.238**	<0.02	<0.026	<0.024	<0.02	<0.02	**0.28**	**0.06**
Total Phenols	**0.76**	<0.10	4.00	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

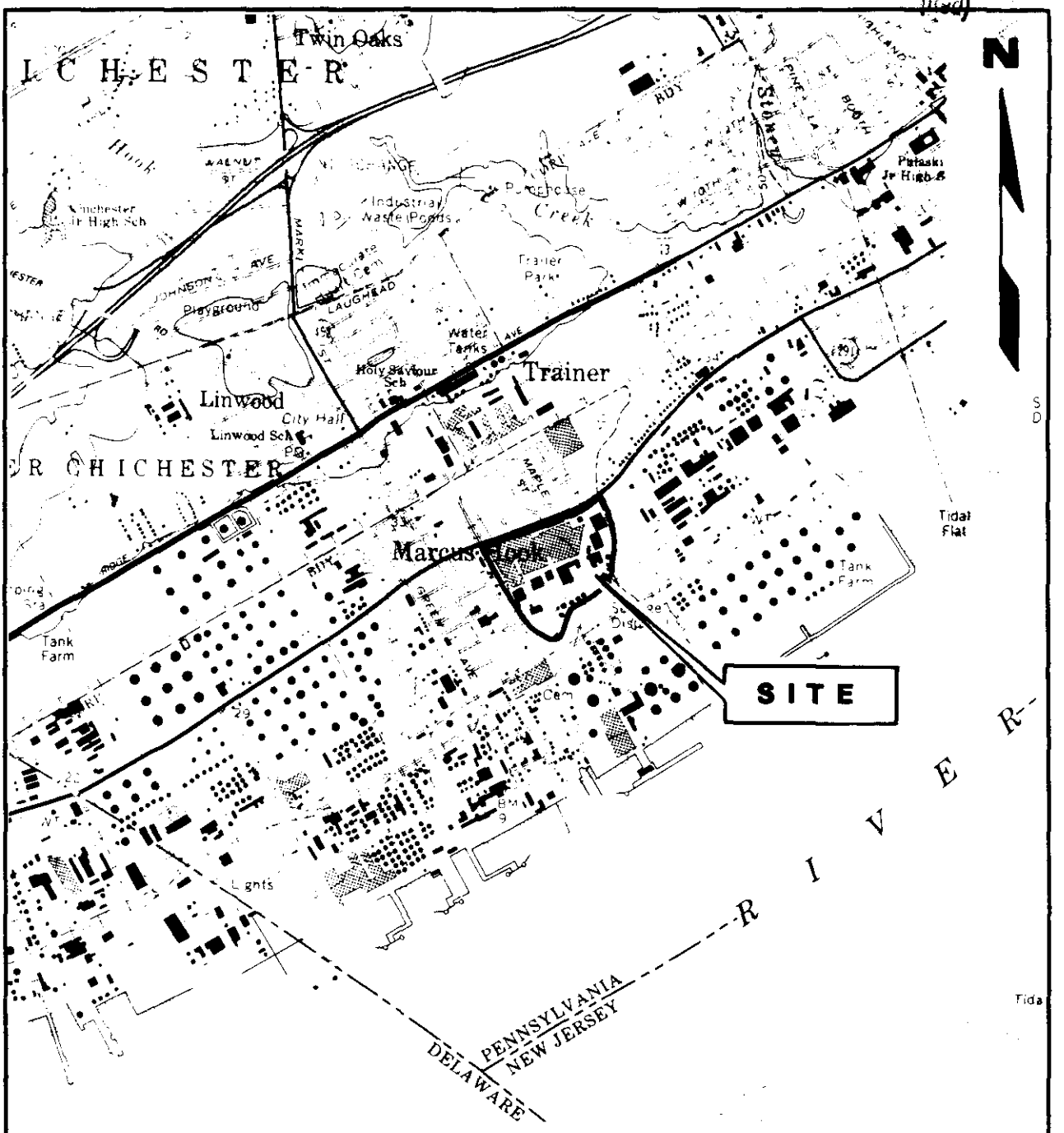
Concentrations reported in milligrams per kilogram (mg/kg).

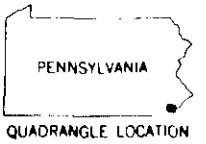
Table 24. Analytical Methods Used for Sample Analysis. FMC Corporation; Marcus Hook, Pennsylvania.

Analysis	Analytical Method	Matrix
Asbestos	Polarized Light Microscopy	Soil
Asbestos	Transmission Electron Microscopy	Aqueous
VOC[1]	USEPA 8240+15	Soil
VOC[1]	USEPA 8240+15	Aqueous
BNA[1]	USEPA 8270+15	Soil
BNA[1]	USEPA 8270+15	Aqueous
PCB	USEPA 8080	Soil
PCB	USEPA 8080	Aqueous
pH	USEPA 9045	Soil
pH	USEPA 9040	Aqueous
TPH	USEPA 418.1	Soil
TPH	USEPA 418.1	Aqueous
Pb	USEPA 7420	Soil
Pb	USEPA 7420	Aqueous
TAL Metals[2]	USEPA 7000-7950	Soil
TAL Metals[2]	USEPA 7000-7950	Aqueous
Cyanide	USEPA 9010	Soil
Cyanide	USEPA 9010	Aqueous
TOC	USEPA 9060	Soil
Phenols	USEPA 9065	Soil
Phenols	USEPA 9065	Aqueous

[1]VOC and BNA plus forward search for fifteen tentatively identified compounds.
[2]TAL Metals consist of Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, Zinc, and Cyanide.

FIGURES





QUADRANGLE LOCATION

SOURCE: U.S.G.S. MARCUS HOOK, PA.–N.J.–DEL. QUADRANGLE 1967
7.5 MINUTES SERIES (TOPOGRAPHIC)
PHOTOREVISED 1986

Title:

SITE LOCATION MAP

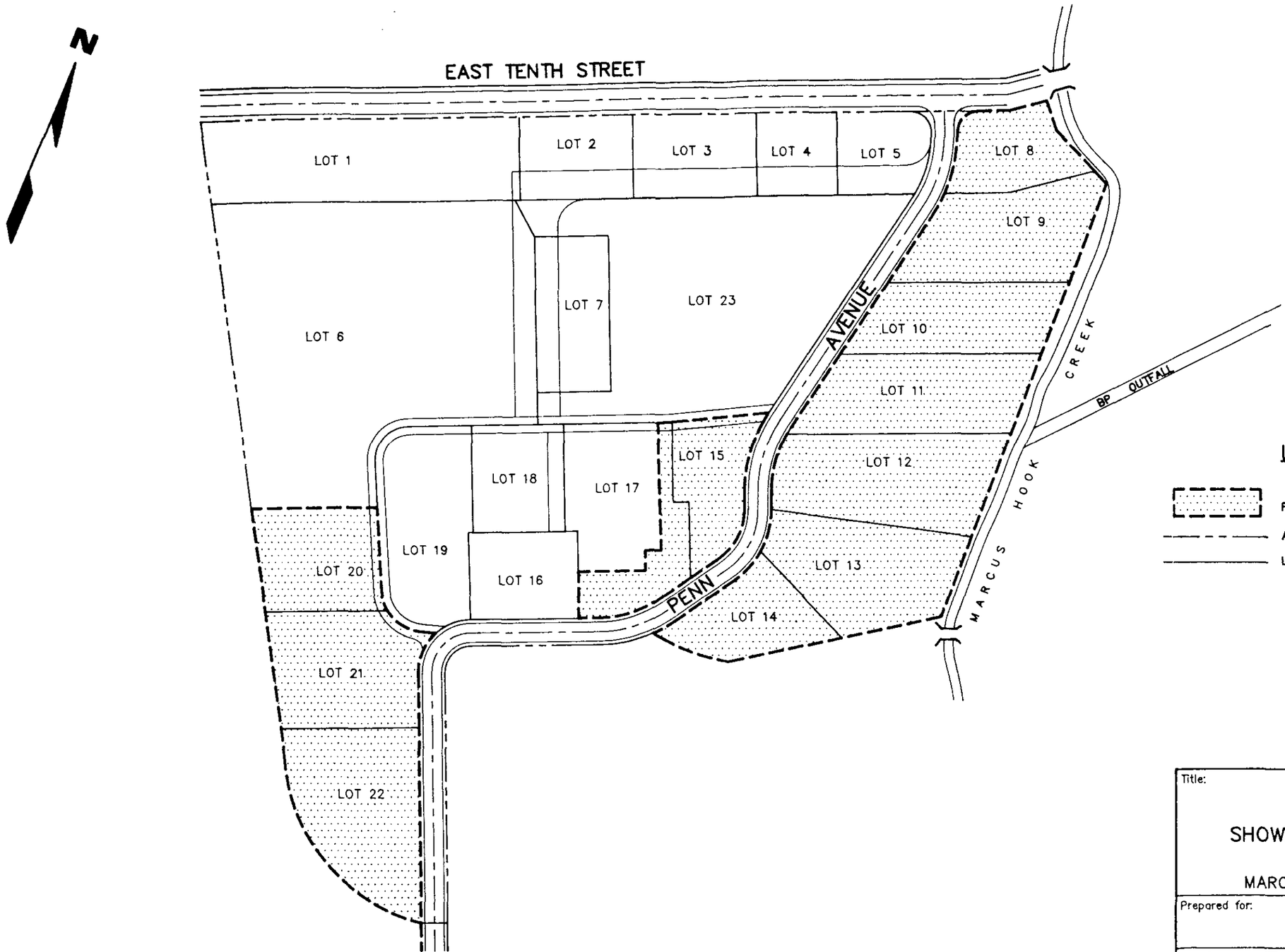
EAST TENTH STREET SITE
MARCUS HOOK, PENNSYLVANIA

Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure 1
Prepared by: M.J.V.	Scale: SHOWN	
Project Mgr: G.D.M.	Revision:	
File No. 01411J		



LEGEND

- FMC AREAS OF INVESTIGATION
- APPROXIMATE PROPERTY LINE
- LOT BOUNDARY LINE

200' 0 200'

Title:

SITE PLAN
SHOWING LOT SUBDIVISIONS

MARCUS HOOK, PENNSYLVANIA

Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure 2
Prepared by: M.J.V.	Scale: SHOWN	
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B24		

ORIGINAL (Red)

N

EAST TENTH STREET

AVENUE

PENN

MARCUS HOOK

CREEK

BP OUTFALL

LOT 8

LOT 9

LOT 10

LOT 11

LOT 12

LOT 13

LOT 14

LOT 15

LOT 17

LOT 20

LOT 21

LOT 22

LEGEND

- MONITORING WELL LOCATION
- TEST PIT EXCAVATION AND SOIL SAMPLE LOCATION
- VISUAL TRENCH EXCAVATION LOCATION
- MAGNETIC LOCATOR SURVEY AREA
- OUTFALL OR CREEK SAMPLING LOCATION
- APPROXIMATE PROPERTY LINE
- LOT BOUNDARY LINE

200' 0 200'

Title:

SITE PLAN SHOWING SAMPLING DISTRIBUTION

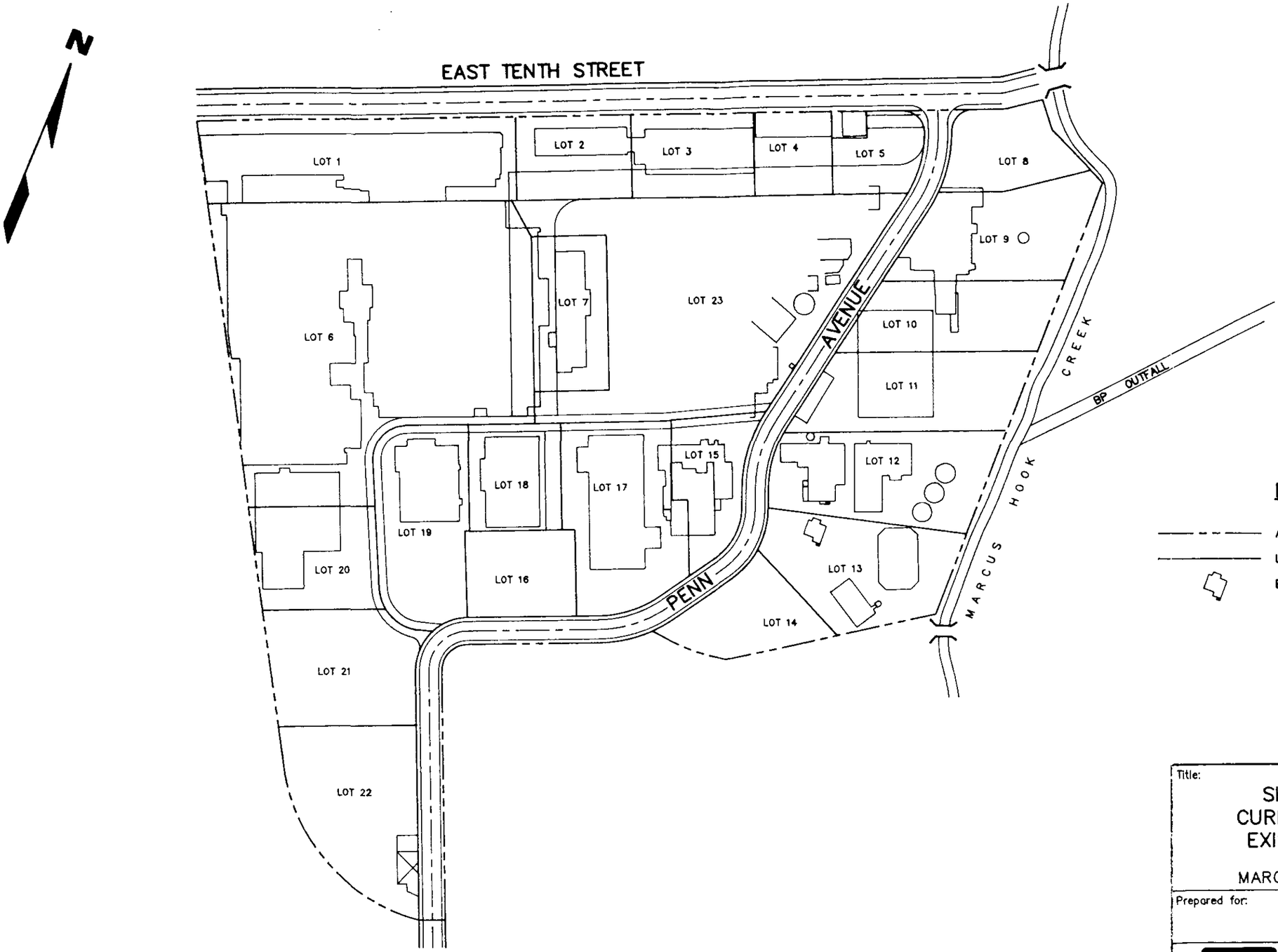
MARCUS HOOK, PENNSYLVANIA

Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure
Prepared by: M.J.V.	Scale: SHOWN	3
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B47		



Title:

SITE PLAN SHOWING CURRENT BUILDINGS AND EXISTING FOUNDATIONS

MARCUS HOOK, PENNSYLVANIA

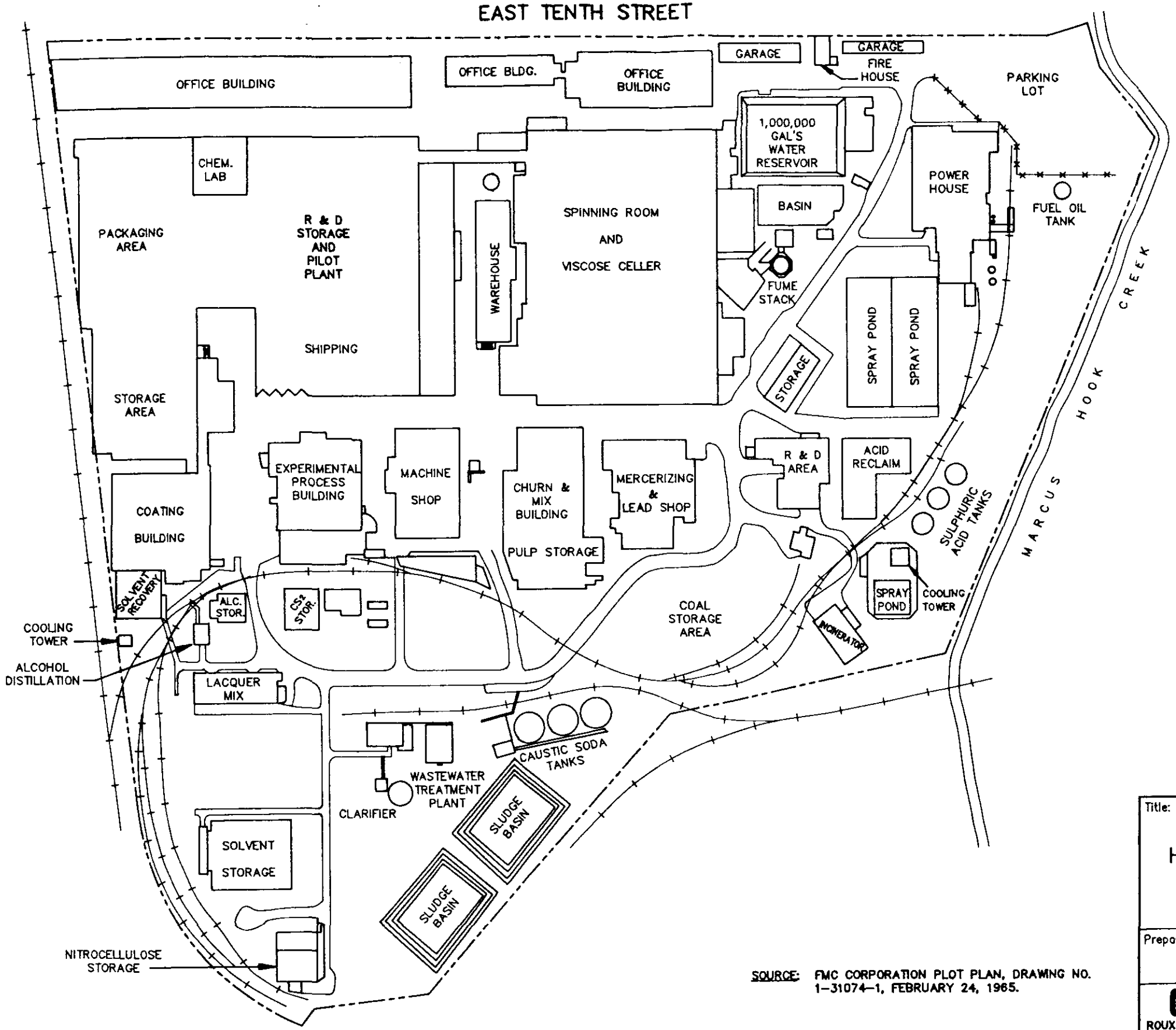
Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure
Prepared by: M.J.V.	Scale: SHOWN	4
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B23		

ORIGINAL
(Red)



SOURCE: FMC CORPORATION PLOT PLAN, DRAWING NO. 1-31074-1, FEBRUARY 24, 1965.

Title:

SITE PLAN SHOWING HISTORICAL PROCESS BUILDINGS AND FEATURES

MARCUS HOOK, PENNSYLVANIA

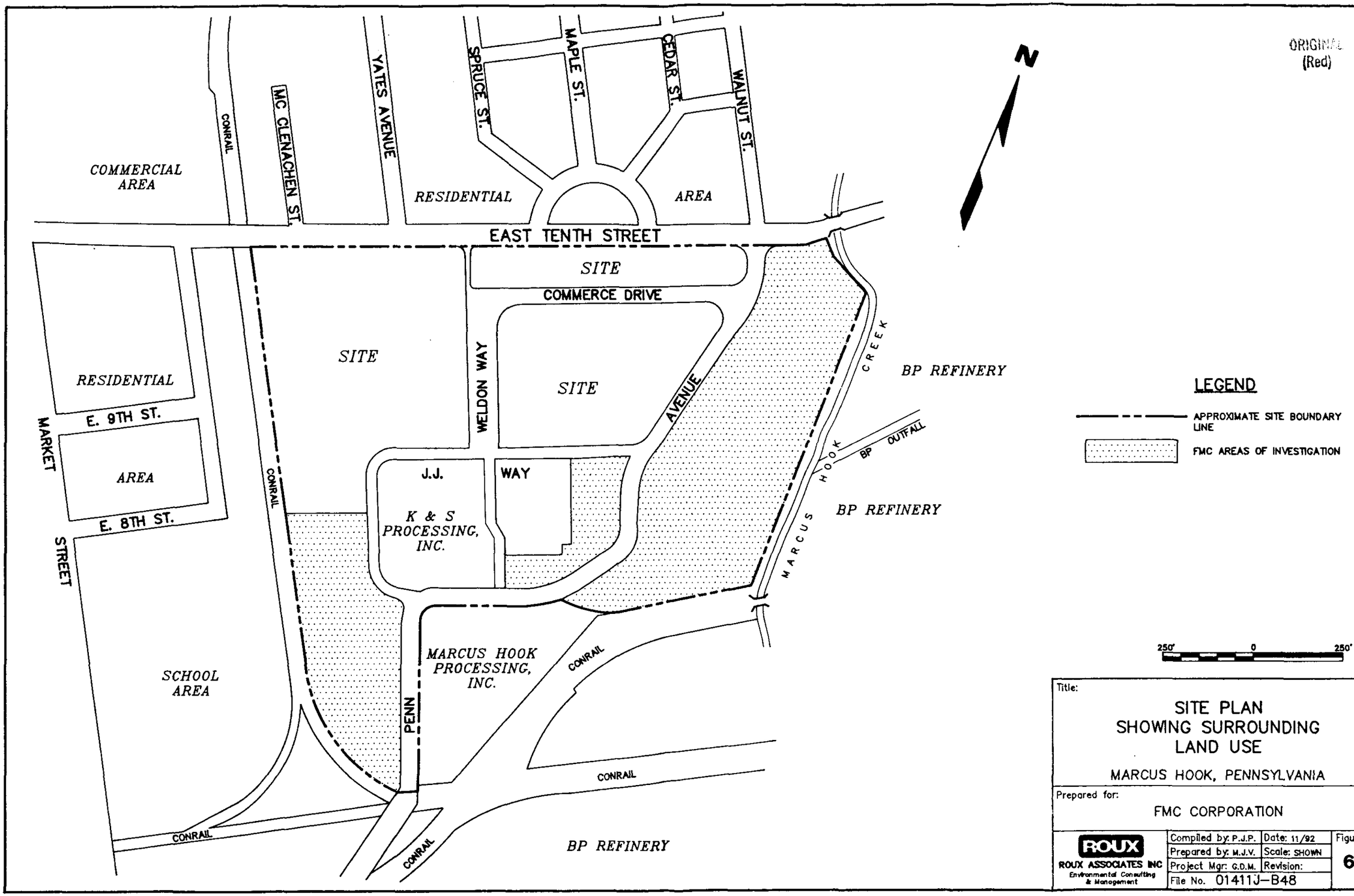
Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure 5
Prepared by: M.J.V.	Scale: N.T.S.	
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B02		

ORIGINAL
(Red)



Title:

SITE PLAN SHOWING SURROUNDING LAND USE

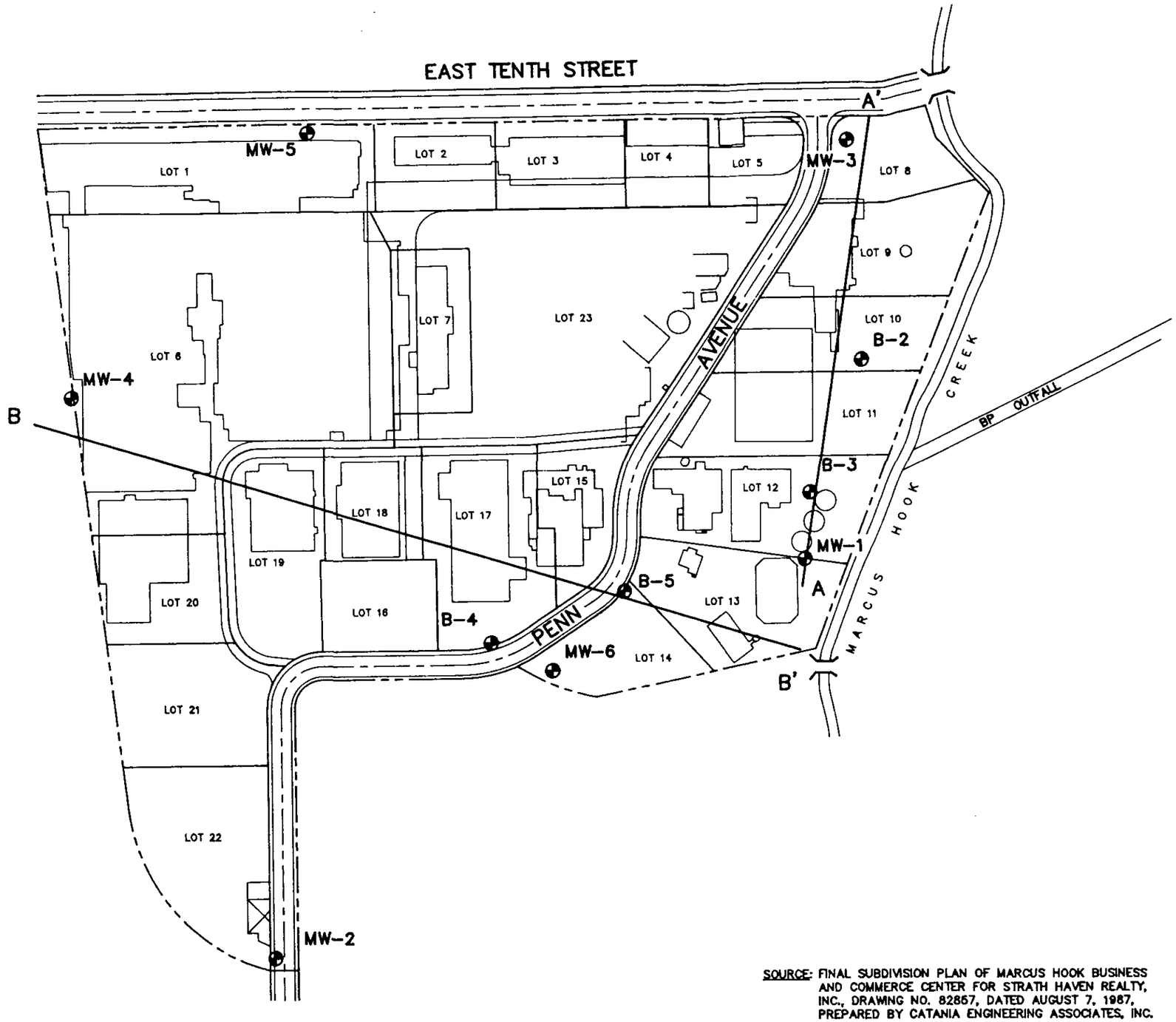
MARCUS HOOK, PENNSYLVANIA

Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure 6
Prepared by: M.J.V.	Scale: SHOWN	
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B48		



SOURCE: FINAL SUBDIVISION PLAN OF MARCUS HOOK BUSINESS AND COMMERCE CENTER FOR STRATH HAVEN REALTY, INC., DRAWING NO. 82857, DATED AUGUST 7, 1987, PREPARED BY CATANIA ENGINEERING ASSOCIATES, INC.

Title:

SITE PLAN SHOWING MONITORING WELL LOCATIONS

MARCUS HOOK, PENNSYLVANIA

Prepared for:

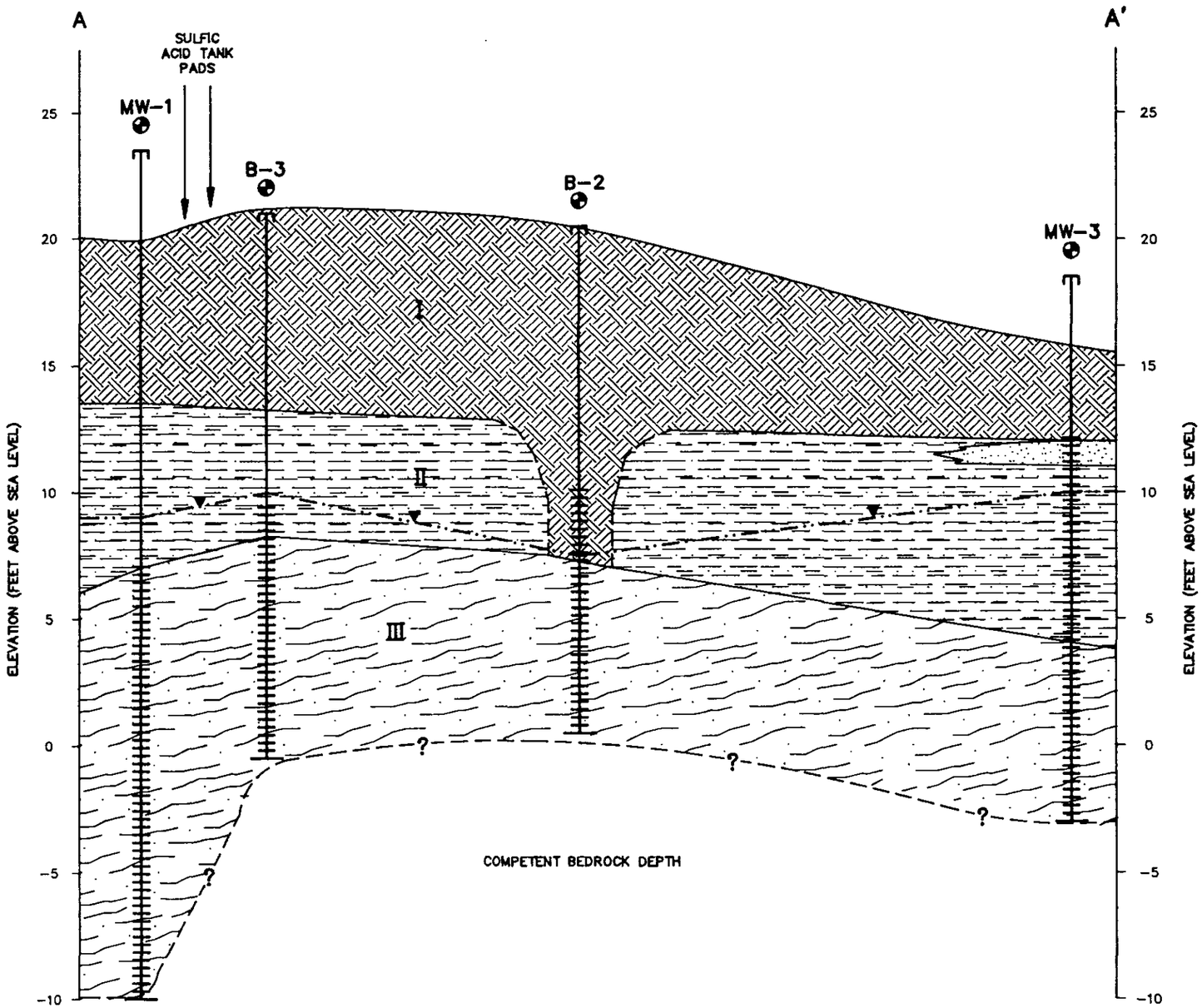
FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92
Prepared by: M.J.V.	Scale: SHOWN
Project Mgr: G.D.M.	Revision:
File No. 01411J-B45	

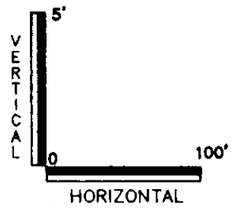
Figure 7

ORIGINAL
(Red)



LEGEND

- MW-1 — MONITORING WELL LOCATION AND IDENTIFICATION
- LITHOLOGIC BOUNDARY WITHIN UNIT
- UNCERTAIN BOUNDARY
- ? — DEPTH UNCERTAIN
- WATER TABLE (APRIL 23, 1992)
- I — VARIOUS MAN-MADE FILL MATERIALS
- II — STIFF SILTY CLAY TO CLAYEY SILT, WITH SOME SAND
- III — UNDIFFERENTIATED SAPROLITE AND WEATHERED SCHIST BEDROCK
- PREDOMINANTLY SANDY LENS
- TOP OF PVC CASING
- WELL SCREEN
- BOTTOM OF WELL



VERTICAL EXAGGERATION = 20X

Title:

GENERALIZED HYDROGEOLOGIC CROSS-SECTION A – A'

MARCUS HOOK, PENNSYLVANIA

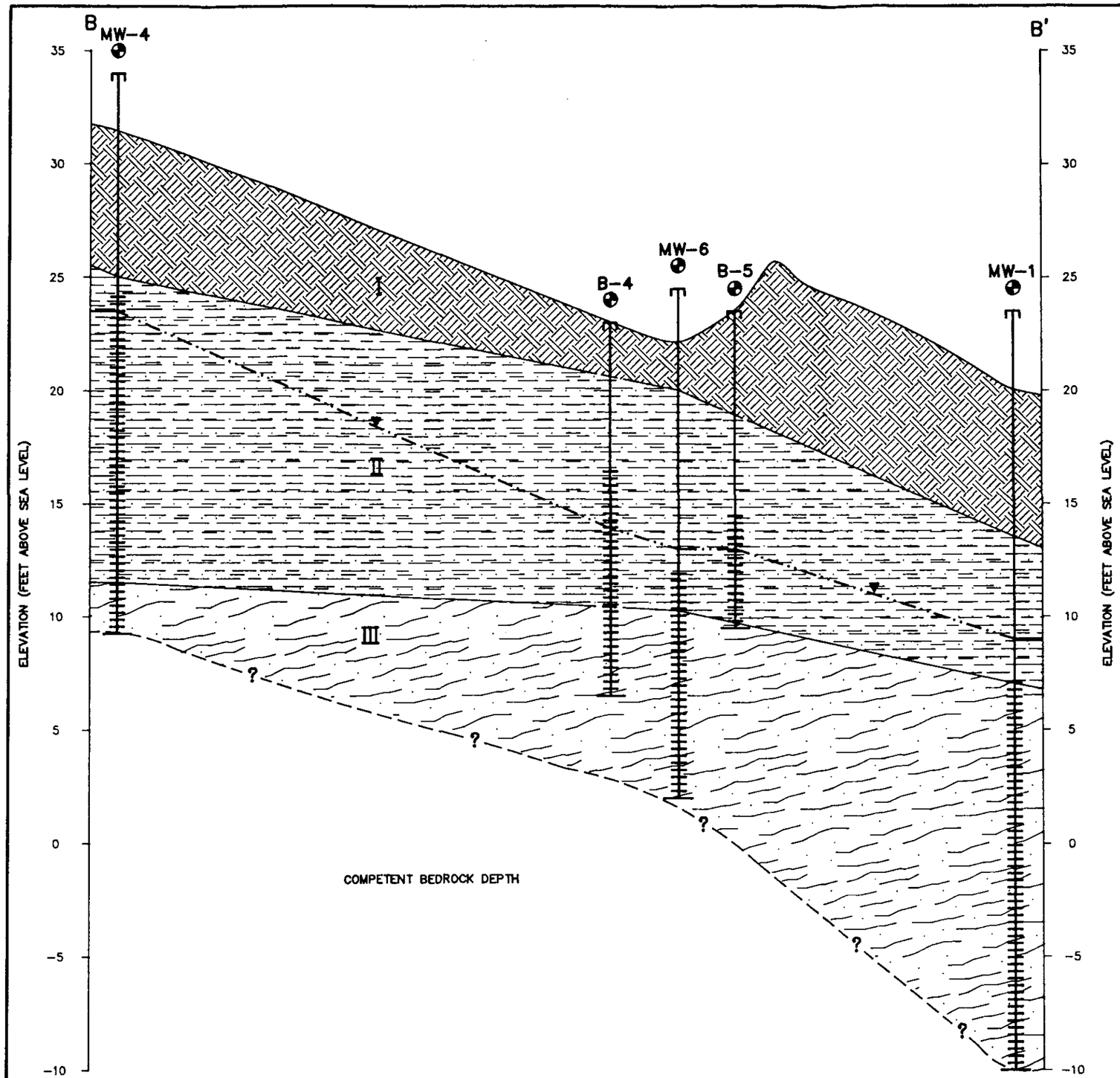
Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

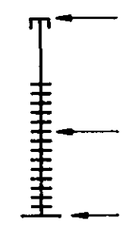
Compiled by: P.J.P.	Date: 11/92	Figure
Prepared by: M.J.V.	Scale: SHOWN	8
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B40		

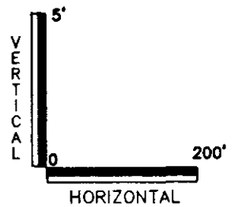
ORIGINAL
(Red)



LEGEND

- MW-1 — MONITORING WELL LOCATION AND IDENTIFICATION
- LITHOLOGIC BOUNDARY WITHIN UNIT
- UNCERTAIN BOUNDARY
- ? — DEPTH UNCERTAIN
- WATER TABLE (APRIL 23, 1992)
- I — VARIOUS MAN-MADE FILL MATERIALS
- II — STIFF SILTY CLAY TO CLAYEY SILT, WITH SOME SAND
- III — UNDIFFERENTIATED SAPROLITE AND WEATHERED SCHIST BEDROCK





VERTICAL EXAGGERATION = 40X

Title:

GENERALIZED HYDROGEOLOGIC CROSS-SECTION B – B'

MARCUS HOOK, PENNSYLVANIA

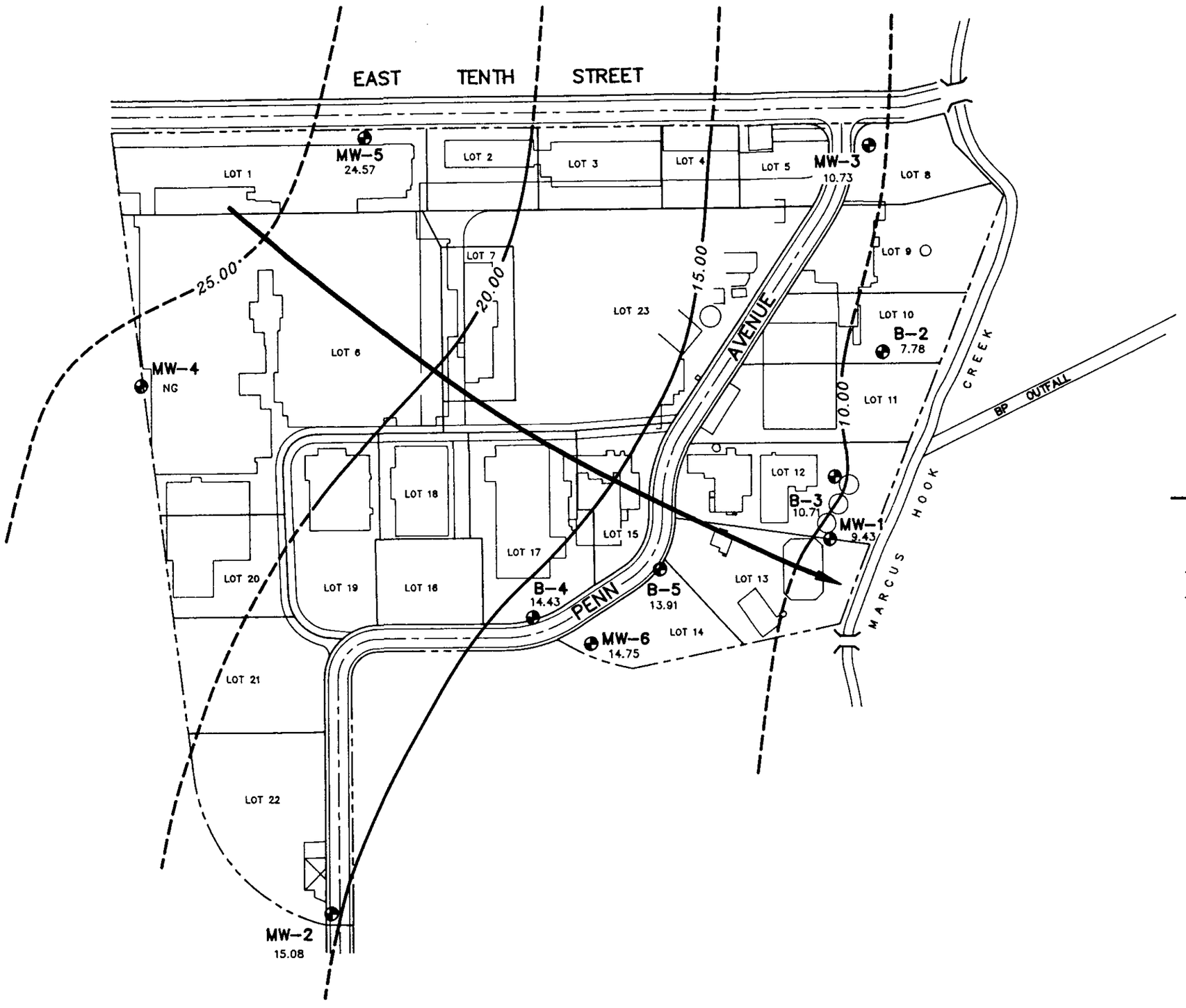
Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure
Prepared by: M.J.V.	Scale: SHOWN	9
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B41		

ORIGINAL
(Red)



LEGEND

MW–1 ⊕	MONITORING WELL LOCATION AND IDENTIFICATION (INSTALLED BY ROUX ASSOCIATES, INC.)
B–2 ⊕	MONITORING WELL LOCATION AND IDENTIFICATION (INSTALLED BY OTHERS)
9.43	WATER–LEVEL ELEVATION (FEET) RELATIVE TO A COMMON DATUM
NG	WELL NOT GAUGED ON THIS DATE
— 20.00 —	LINE OF EQUAL WATER–LEVEL ELEVATION (FEET) RELATIVE TO A COMMON DATUM (DASHED WHERE INFERRED)
➡	DIRECTION OF GROUND–WATER FLOW
– – – –	APPROXIMATE PROPERTY LINE
———	LOT BOUNDARY LINE

200' 0 200'

CONTOUR INTERVAL = 5.00 FEET

Title:

WATER–LEVEL ELEVATION CONTOUR MAP MARCH 24, 1992

MARCUS HOOK, PENNSYLVANIA

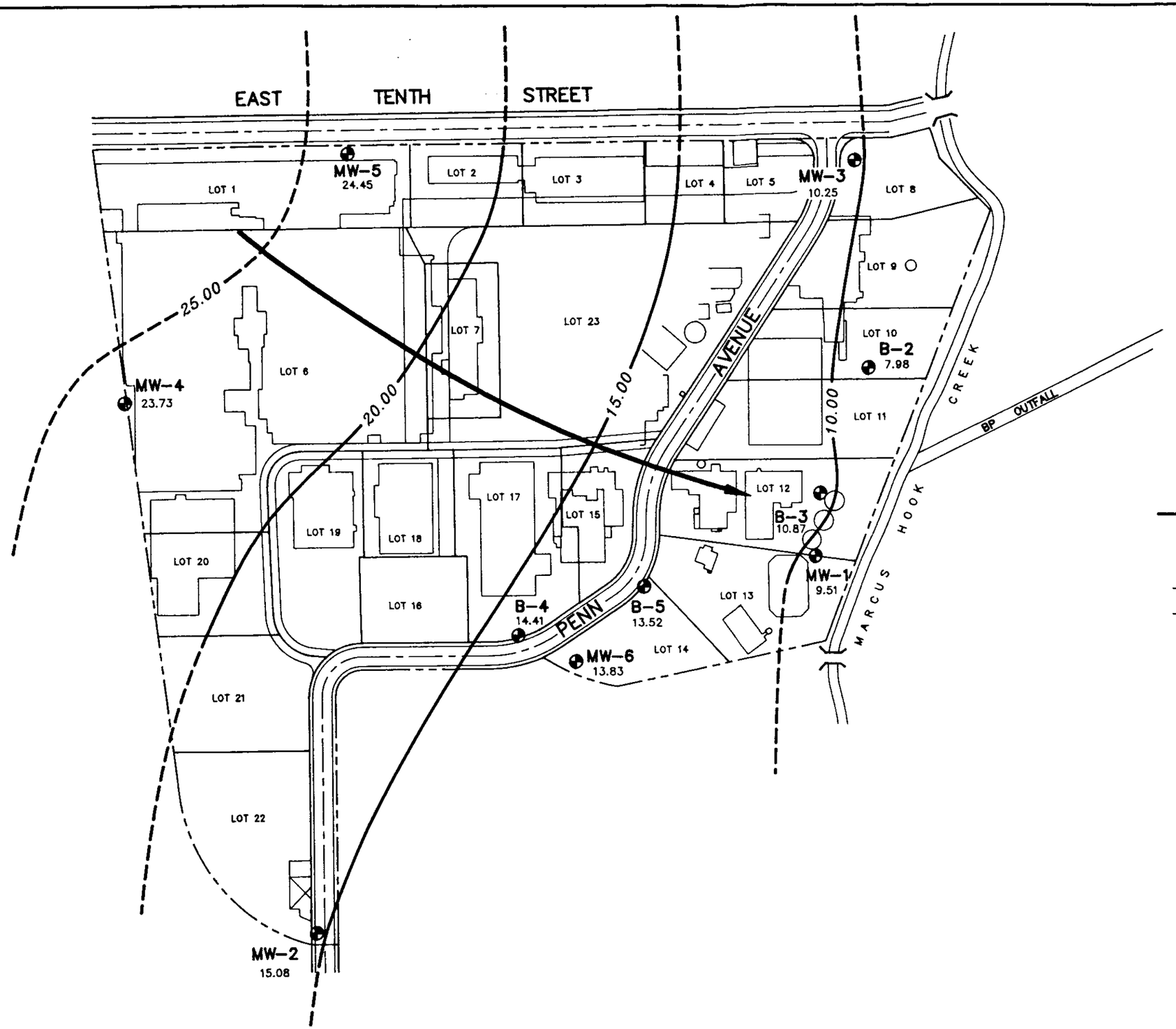
Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure
Prepared by: M.J.V.	Scale: SHOWN	10
Project Mgr: G.D.M.	Revision:	
File No. 01411J–B15		

ORIGINAL
(Red)



N

LEGEND

MW-1 ⊕	MONITORING WELL LOCATION AND IDENTIFICATION (INSTALLED BY ROUX ASSOCIATES, INC.)
B-2 ⊕	MONITORING WELL LOCATION AND IDENTIFICATION (INSTALLED BY OTHERS)
9.51	WATER-LEVEL ELEVATION (FEET) RELATIVE TO A COMMON DATUM
— 20.00 —	LINE OF EQUAL WATER-LEVEL ELEVATION (FEET) RELATIVE TO A COMMON DATUM (DASHED WHERE INFERRED)
➡	DIRECTION OF GROUND-WATER FLOW
— — —	APPROXIMATE PROPERTY LINE
———	LOT BOUNDARY LINE

200' 0 200'

CONTOUR INTERVAL = 5.00 FEET

Title:

WATER-LEVEL ELEVATION CONTOUR MAP APRIL 8, 1992

MARCUS HOOK, PENNSYLVANIA

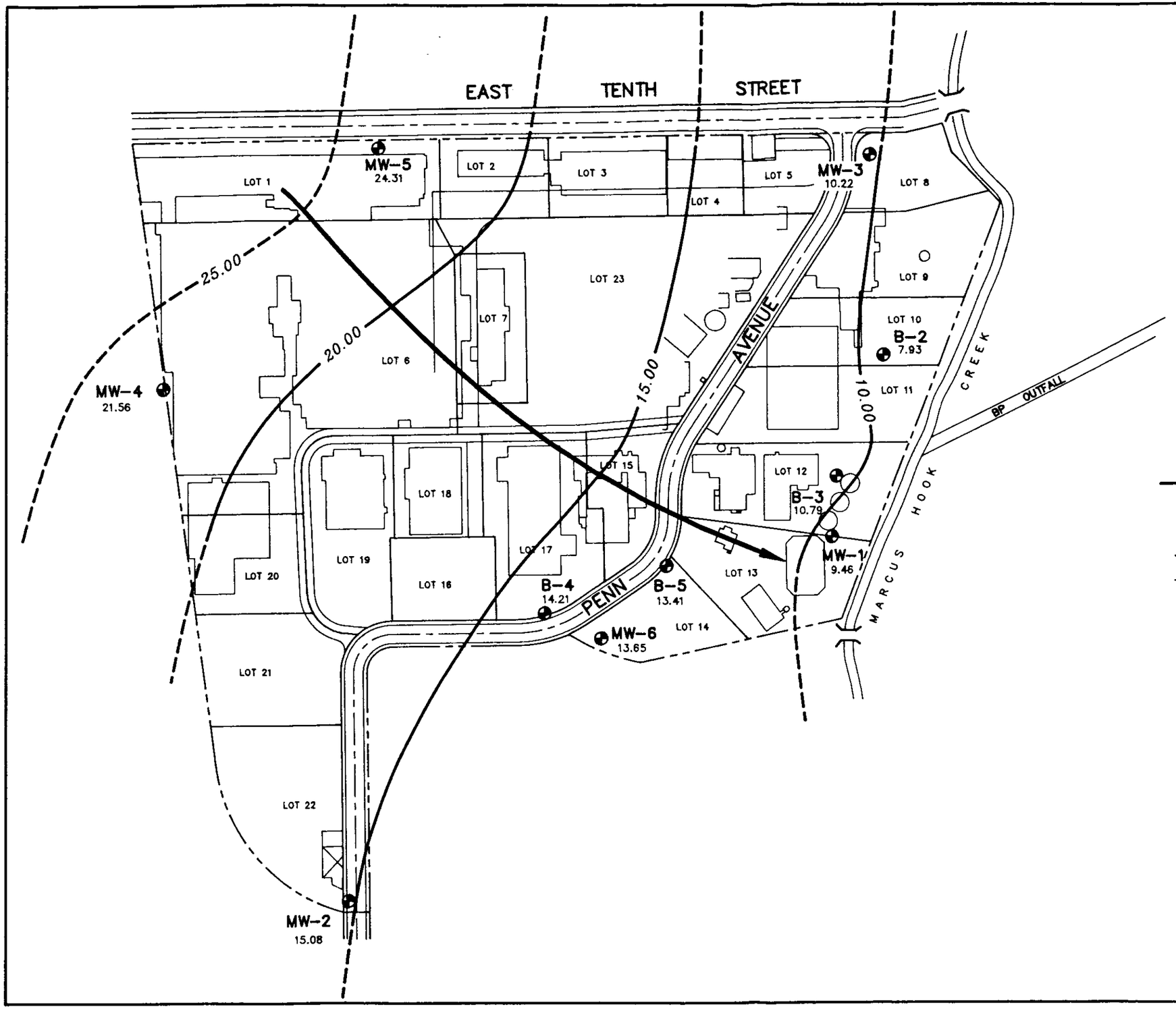
Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure 11
Prepared by: M.J.V.	Scale: SHOWN	
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B16		

ORIGINAL
(Red)



LEGEND

MW-1 ◒	MONITORING WELL LOCATION AND IDENTIFICATION (INSTALLED BY ROUX ASSOCIATES, INC.)
B-2 ◒	MONITORING WELL LOCATION AND IDENTIFICATION (INSTALLED BY OTHERS)
9.46	WATER-LEVEL ELEVATION (FEET) RELATIVE TO A COMMON DATUM
— 20.00 —	LINE OF EQUAL WATER-LEVEL ELEVATION (FEET) RELATIVE TO A COMMON DATUM (DASHED WHERE INFERRED)
➡	DIRECTION OF GROUND-WATER FLOW
- - - -	APPROXIMATE PROPERTY LINE
———	LOT BOUNDARY LINE

200' 0 200'

CONTOUR INTERVAL = 5.00 FEET

Title:

WATER-LEVEL ELEVATION CONTOUR MAP APRIL 9, 1992

MARCUS HOOK, PENNSYLVANIA

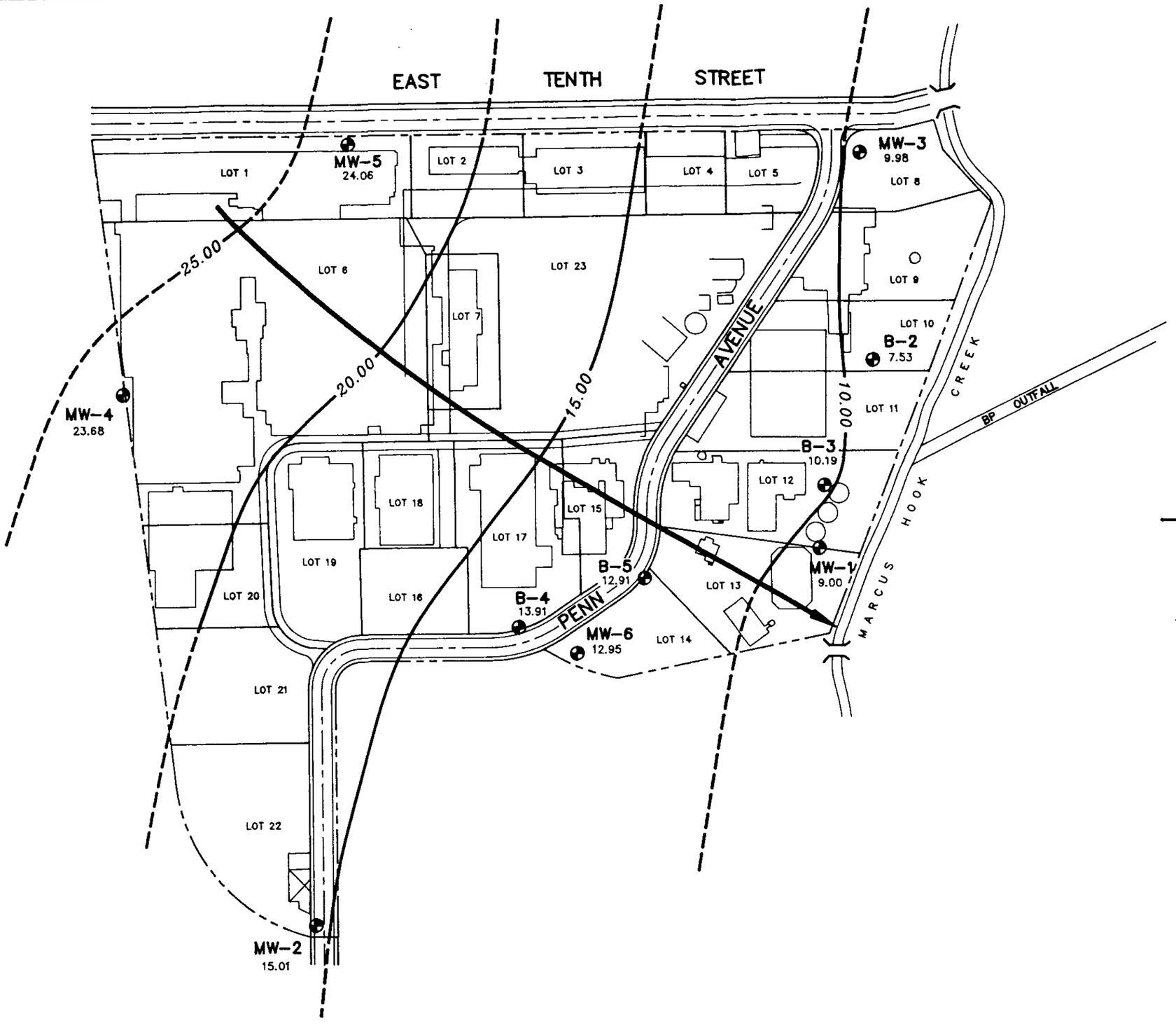
Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure 12
Prepared by: M.J.V.	Scale: SHOWN	
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B18		

ORIGINAL
(Red)



LEGEND

- MW-1 — MONITORING WELL LOCATION AND IDENTIFICATION (INSTALLED BY ROUX ASSOCIATES, INC.)
- B-2 — MONITORING WELL LOCATION AND IDENTIFICATION (INSTALLED BY OTHERS)
- 9.00 — WATER-LEVEL ELEVATION (FEET) RELATIVE TO A COMMON DATUM
- 20.00 — LINE OF EQUAL WATER-LEVEL ELEVATION (FEET) RELATIVE TO A COMMON DATUM (DASHED WHERE INFERRED)
- DIRECTION OF GROUND-WATER FLOW
- APPROXIMATE PROPERTY LINE
- LOT BOUNDARY LINE

200' 0 200'

CONTOUR INTERVAL = 5.00 FEET

Title:

WATER-LEVEL ELEVATION CONTOUR MAP APRIL 23, 1992

MARCUS HOOK, PENNSYLVANIA

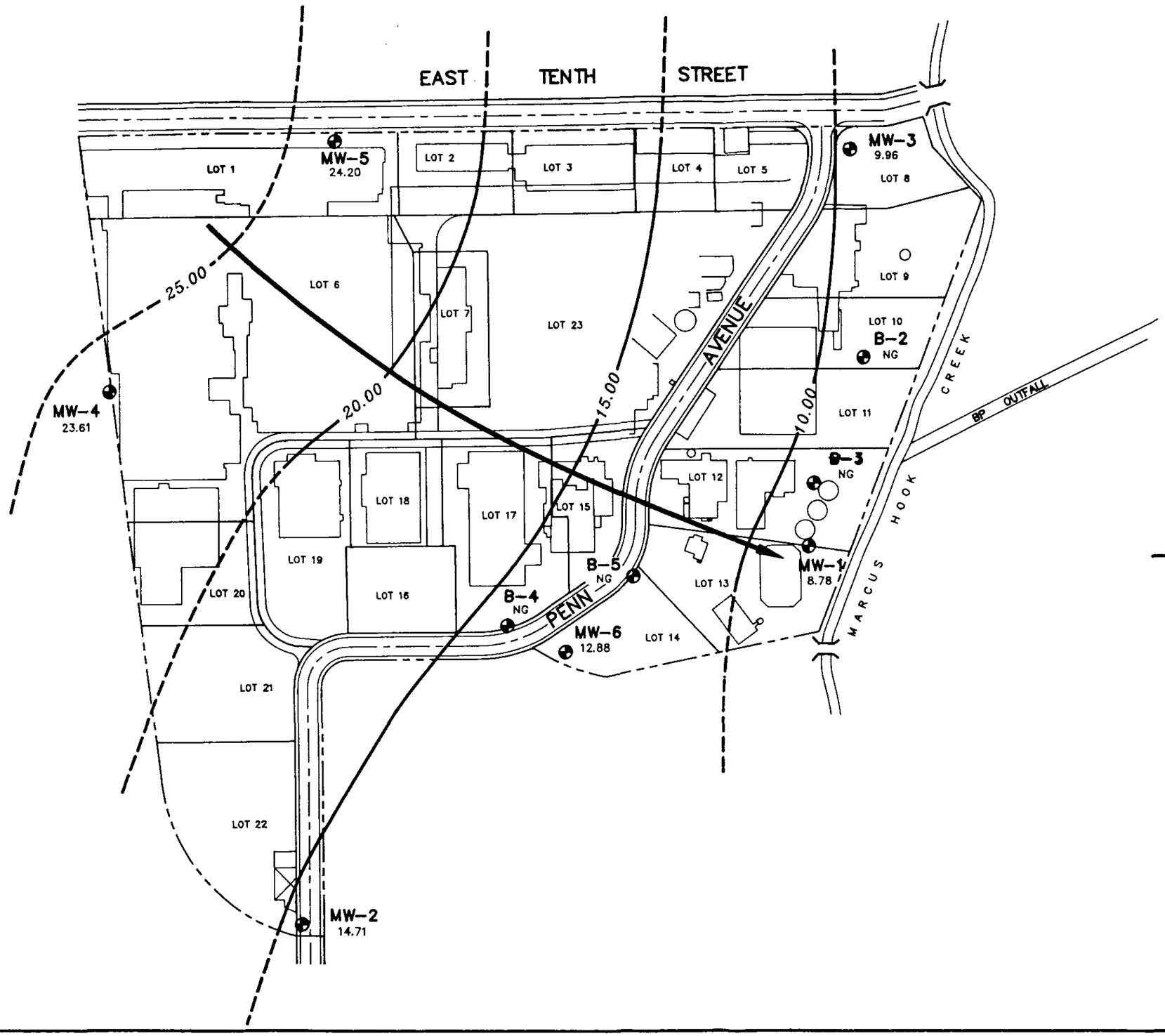
Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure
Prepared by: M.J.V.	Scale: SHOWN	13
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B17		

ORIGINAL
(Red)



LEGEND

MW-1 ◒	MONITORING WELL LOCATION AND IDENTIFICATION (INSTALLED BY ROUX ASSOCIATES, INC.)
B-2 ◒	MONITORING WELL LOCATION AND IDENTIFICATION (INSTALLED BY OTHERS)
8.78	WATER-LEVEL ELEVATION (FEET) RELATIVE TO A COMMON DATUM
NG	HISTORICAL WELLS NOT GAUGED ON THIS DATE
— 20.00 —	LINE OF EQUAL WATER-LEVEL ELEVATION (FEET) RELATIVE TO A COMMON DATUM (DASHED WHERE INFERRED)
➡	DIRECTION OF GROUND-WATER FLOW
- - - -	APPROXIMATE PROPERTY LINE
———	LOT BOUNDARY LINE

200' 0 200'

CONTOUR INTERVAL = 5.00 FEET

Title:

WATER-LEVEL ELEVATION CONTOUR MAP JUNE 29, 1992

MARCUS HOOK, PENNSYLVANIA

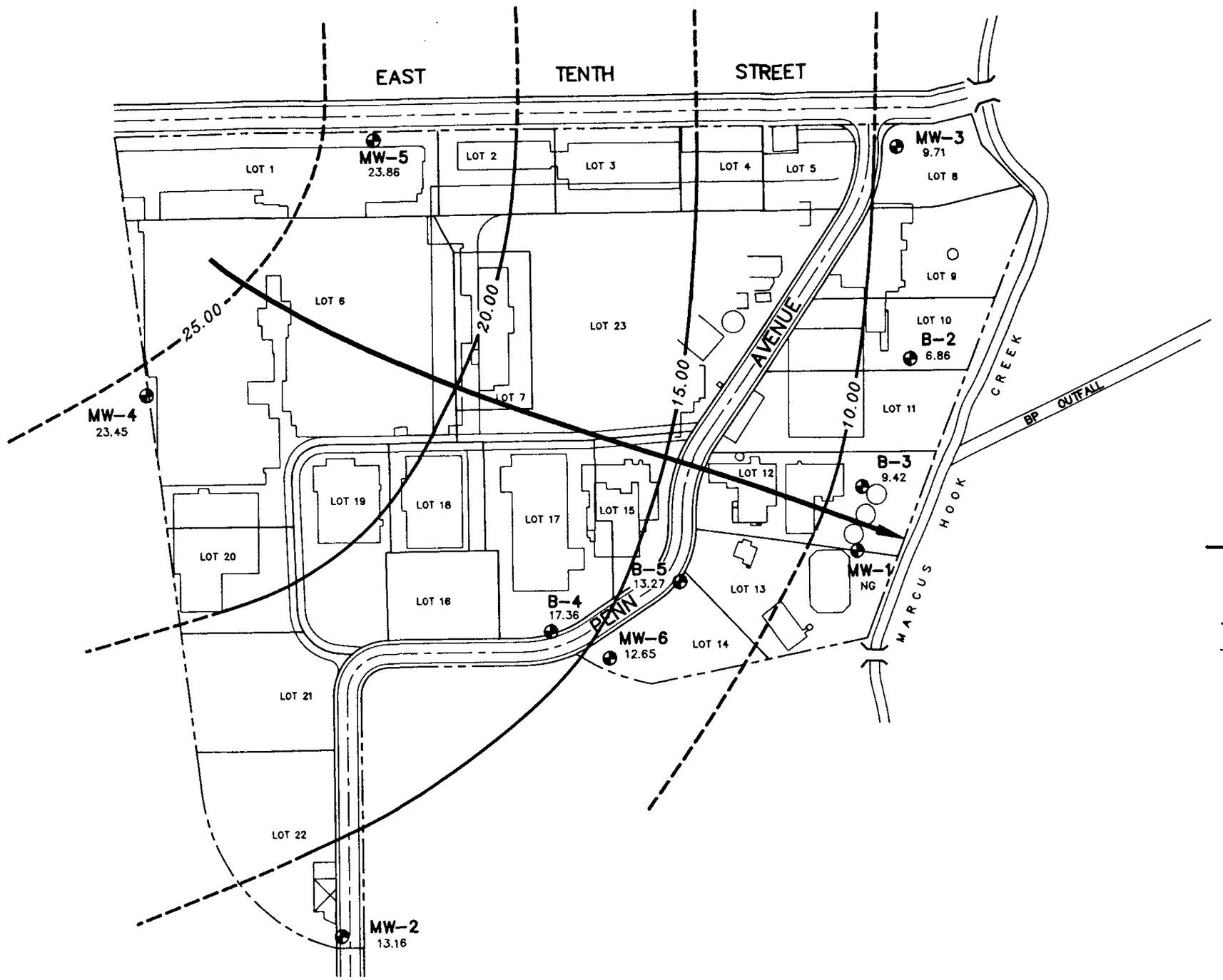
Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure 14
Prepared by: M.J.V.	Scale: SHOWN	
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B19		

ORIGINAL
(Red)



LEGEND

MW-1 ⊕	MONITORING WELL LOCATION AND IDENTIFICATION (INSTALLED BY ROUX ASSOCIATES, INC.)
B-2 ⊕	MONITORING WELL LOCATION AND IDENTIFICATION (INSTALLED BY OTHERS)
6.86	WATER-LEVEL ELEVATION (FEET) RELATIVE TO A COMMON DATUM
NG	NOT GAUGED DUE TO VANDALISM
— 20.00 —	LINE OF EQUAL WATER-LEVEL ELEVATION (FEET) RELATIVE TO A COMMON DATUM (DASHED WHERE INFERRED)
➡	DIRECTION OF GROUND-WATER FLOW
- - - -	APPROXIMATE PROPERTY LINE
———	LOT BOUNDARY LINE

200' 0 200'

CONTOUR INTERVAL = 5.00 FEET

Title:

WATER-LEVEL ELEVATION CONTOUR MAP JULY 30, 1992

MARCUS HOOK, PENNSYLVANIA

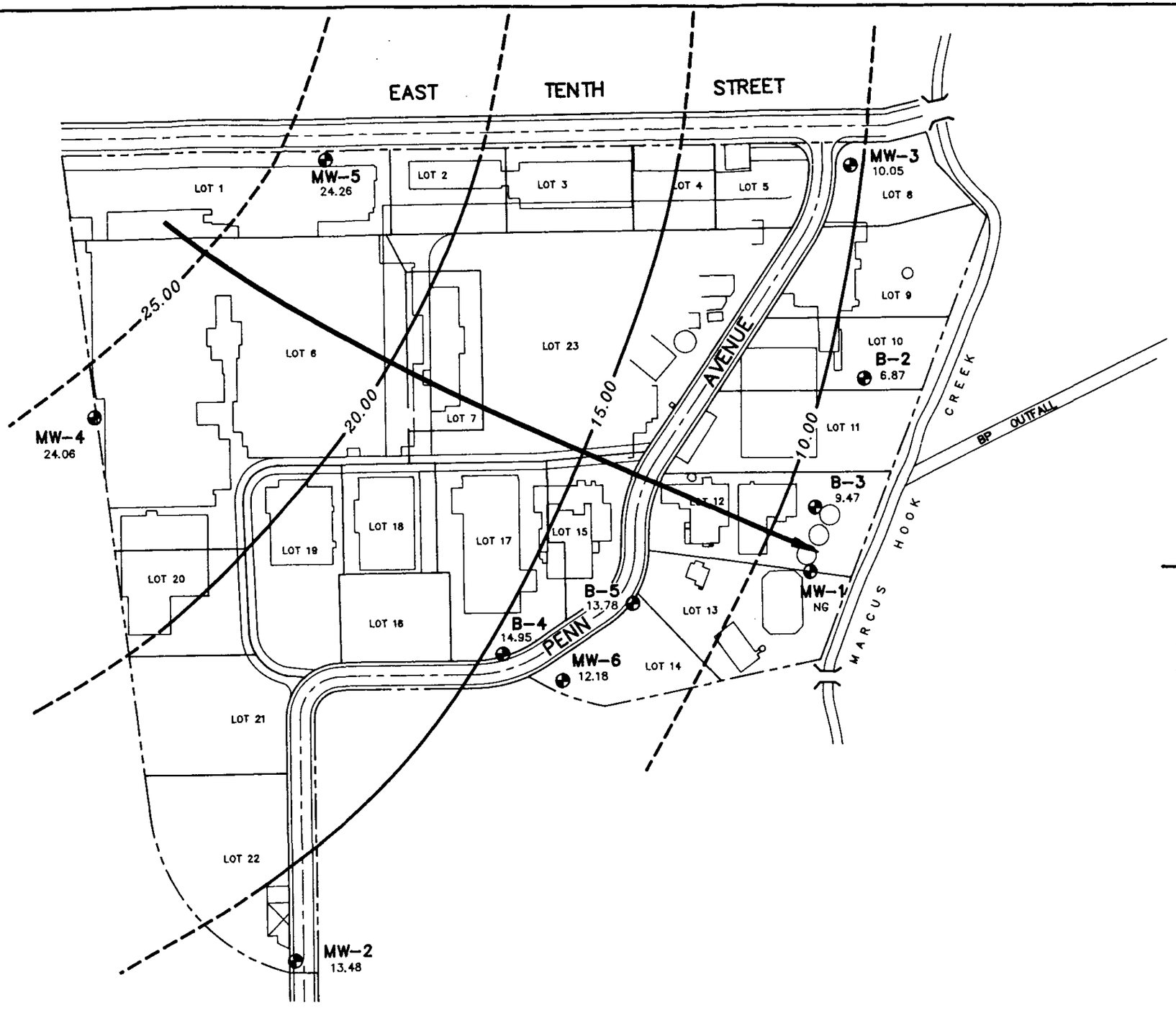
Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure
Prepared by: M.J.V.	Scale: SHOWN	15
Project Mgr: C.D.M.	Revision:	
File No. 01411J-B27		

ORIGINAL
(Red)



N

LEGEND

MW-1	MONITORING WELL LOCATION AND IDENTIFICATION (INSTALLED BY ROUX ASSOCIATES, INC.)
B-2	MONITORING WELL LOCATION AND IDENTIFICATION (INSTALLED BY OTHERS)
6.87	WATER-LEVEL ELEVATION (FEET) RELATIVE TO A COMMON DATUM
NG	NOT GAUGED DUE TO VANDALISM
— 20.00 —	LINE OF EQUAL WATER-LEVEL ELEVATION (FEET) RELATIVE TO A COMMON DATUM (DASHED WHERE INFERRED)
➡	DIRECTION OF GROUND-WATER FLOW
- - - -	APPROXIMATE PROPERTY LINE
———	LOT BOUNDARY LINE

200' 0 200'

CONTOUR INTERVAL = 5.00 FEET

Title:

WATER-LEVEL ELEVATION CONTOUR MAP AUGUST 21, 1992

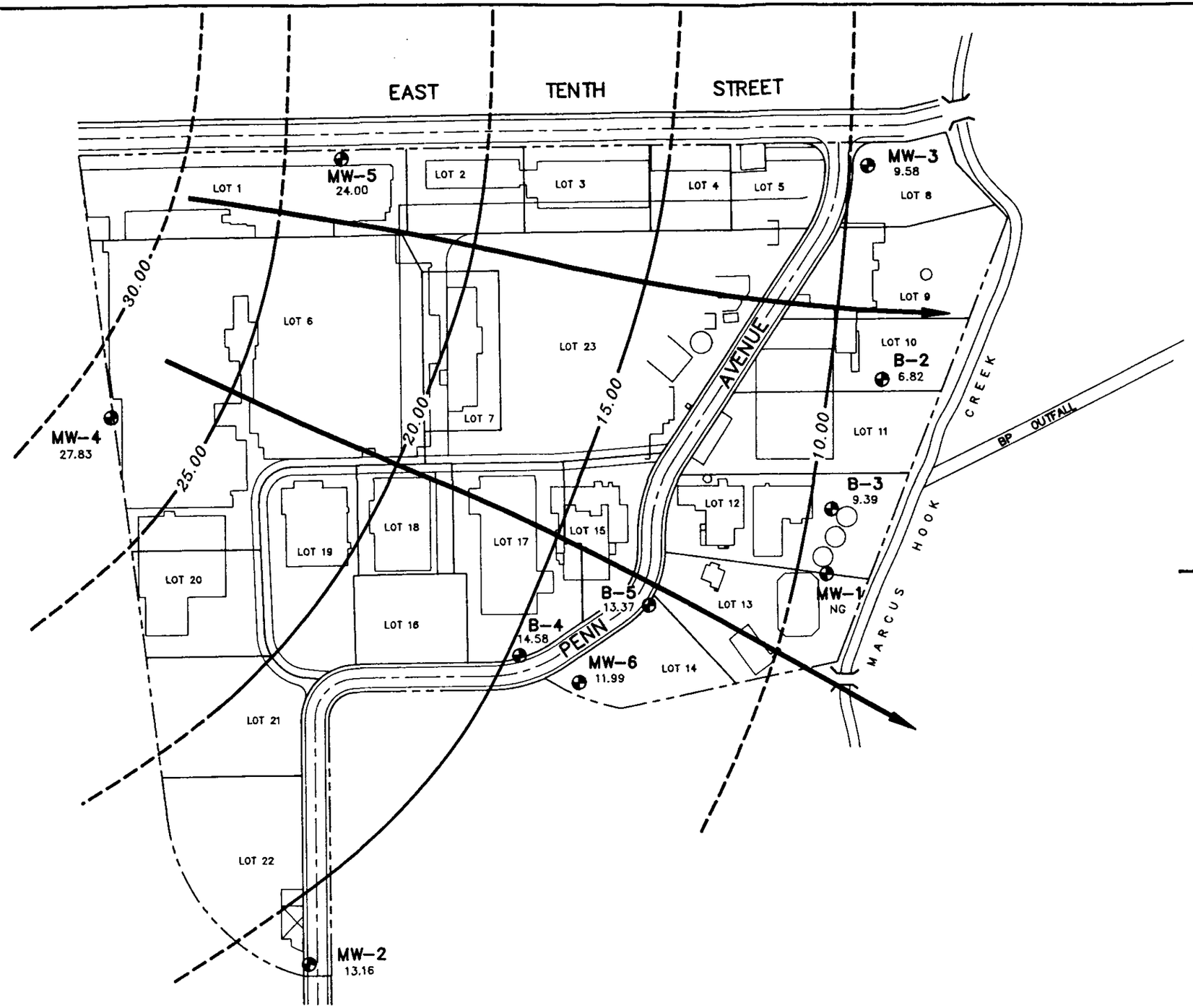
MARCUS HOOK, PENNSYLVANIA

Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure
Prepared by: M.J.V.	Scale: SHOWN	16
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B42		



LEGEND

MW-1 ◒	MONITORING WELL LOCATION AND IDENTIFICATION (INSTALLED BY ROUX ASSOCIATES, INC.)
B-2 ◒	MONITORING WELL LOCATION AND IDENTIFICATION (INSTALLED BY OTHERS)
13.16	WATER-LEVEL ELEVATION (FEET) RELATIVE TO A COMMON DATUM
NG	NOT GAUGED DUE TO VANDALISM
— 20.00 —	LINE OF EQUAL WATER-LEVEL ELEVATION (FEET) RELATIVE TO A COMMON DATUM (DASHED WHERE INFERRED)
➡	DIRECTION OF GROUND-WATER FLOW
- - - -	APPROXIMATE PROPERTY LINE
———	LOT BOUNDARY LINE

200' 0 200'

CONTOUR INTERVAL = 5.00 FEET

Title:

WATER-LEVEL ELEVATION CONTOUR MAP SEPTEMBER 23, 1992

MARCUS HOOK, PENNSYLVANIA

Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92
Prepared by: M.J.V.	Scale: SHOWN
Project Mgr: G.D.M.	Revision:
File No. 01411J-B46	

Figure 17

(Red)

*NOTE: A PRECIPITATION EVENT RESULTED IN SURFACE WATER RUNOFF ENTERING THE MONITORING WELL.

MARCUS HOOK CREEK

MW-3

MW-6

B-3

WATER ABOVE TRANSDUCER IN FEET

ELAPSED TIME

7/22/92

7/23/92

Title:

TIDAL EFFECT ON MARCUS HOOK CREEK AND MONITORING WELLS

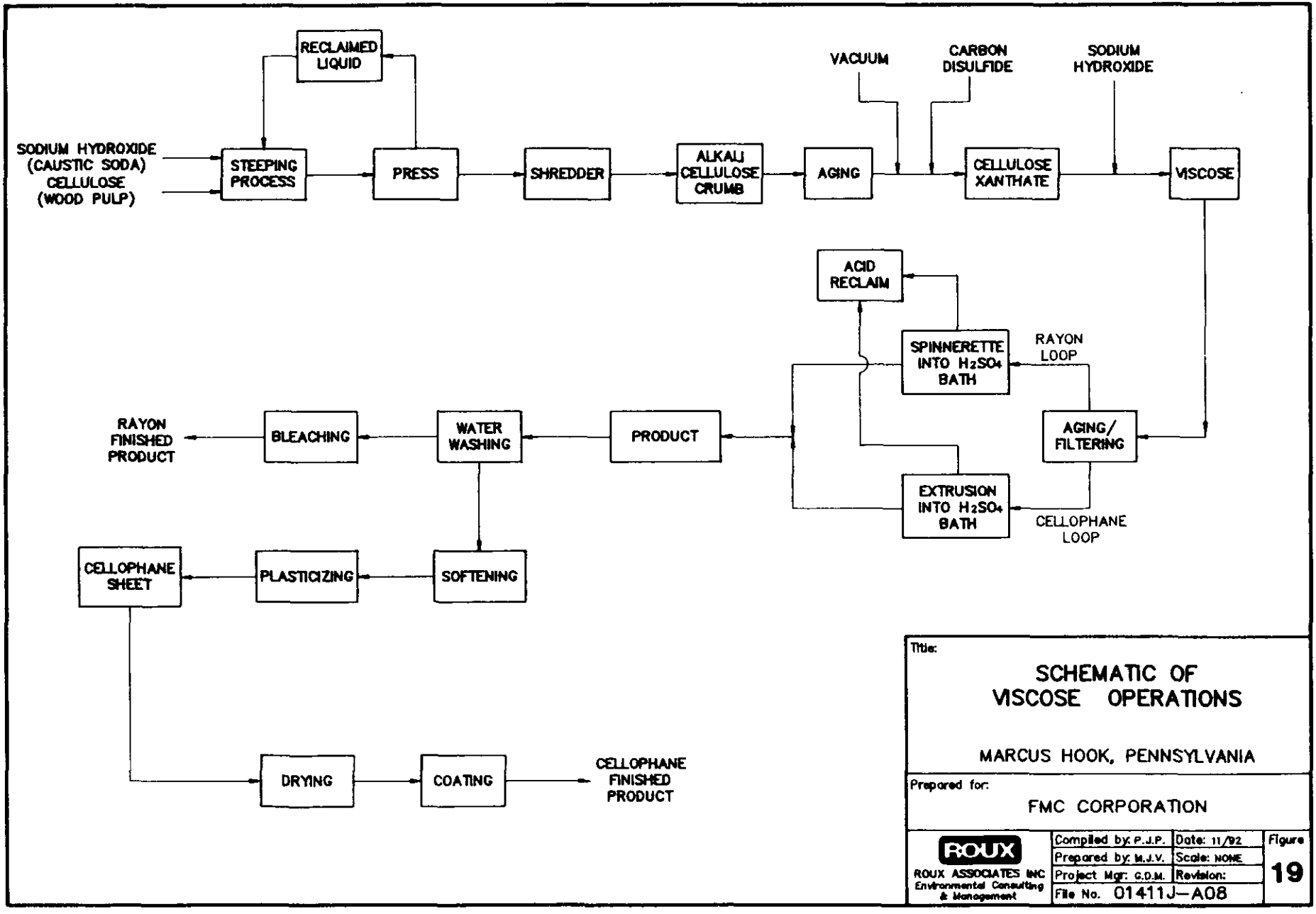
MARCUS HOOK, PENNSYLVANIA

Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure 18
Prepared by: M.J.V.	Scale: SHOWN	
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B26		



Title:

SCHEMATIC OF VISCOSE OPERATIONS

MARCUS HOOK, PENNSYLVANIA

Prepared for:

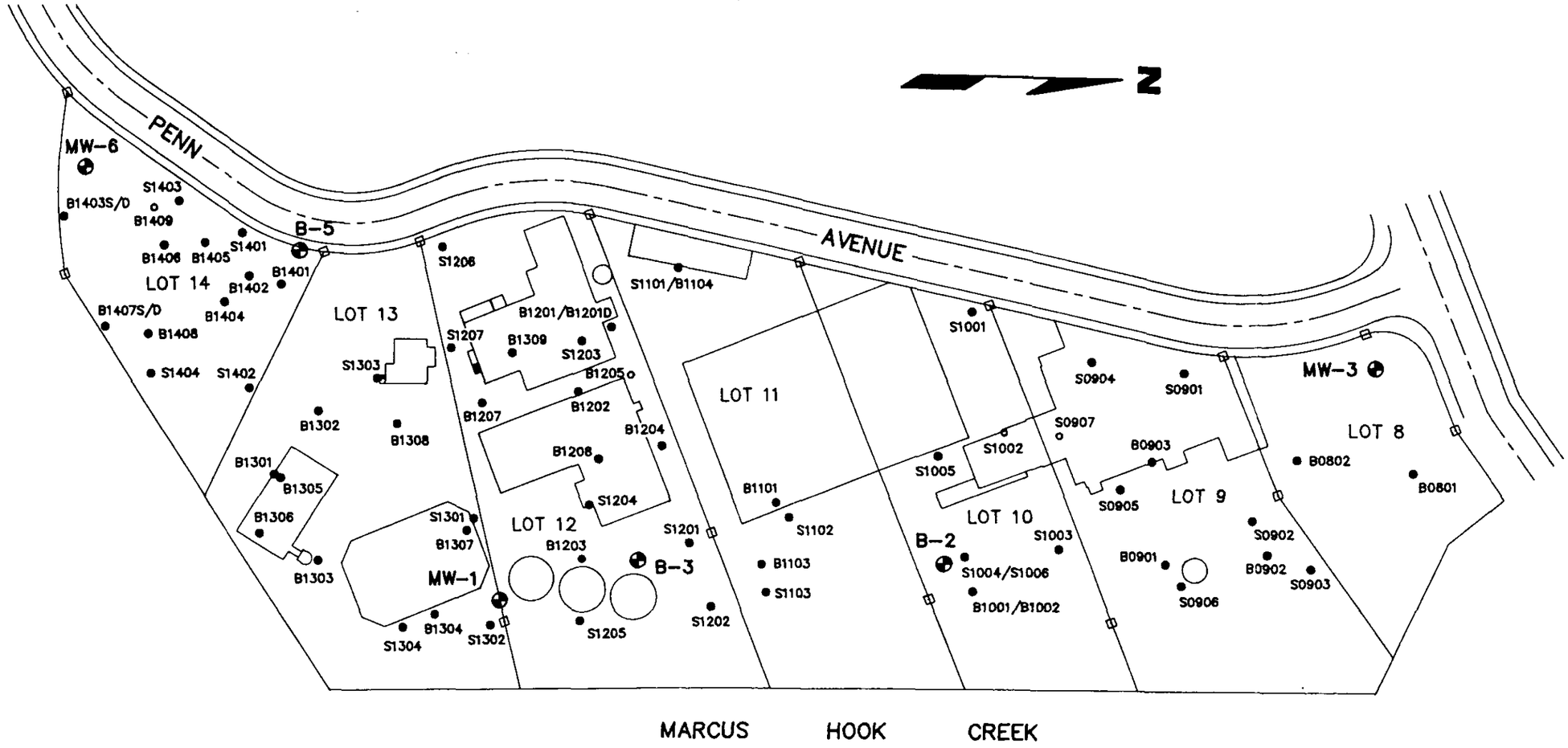
FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure 19
Prepared by: M.J.V.	Scale: NONE	
Project Mgr: C.D.M.	Revision:	
File No. 01411J–A08		

ORIGINAL (Red)

ORIGINAL
(Red)



100' 0 100'

LEGEND

MW-1	MONITORING WELL LOCATION AND IDENTIFICATION (INSTALLED BY ROUX ASSOCIATES, INC.)
B-2	MONITORING WELL LOCATION AND IDENTIFICATION (INSTALLED BY OTHERS)
B0801	SOIL SAMPLE LOCATION AND IDENTIFICATION
S0907	SOIL SAMPLE NOT COLLECTED
	MONUMENT LOCATION
	LOT BOUNDARY LINE

Title:

SOIL SAMPLE LOCATIONS FOR LOTS 8 – 14

MARCUS HOOK, PENNSYLVANIA

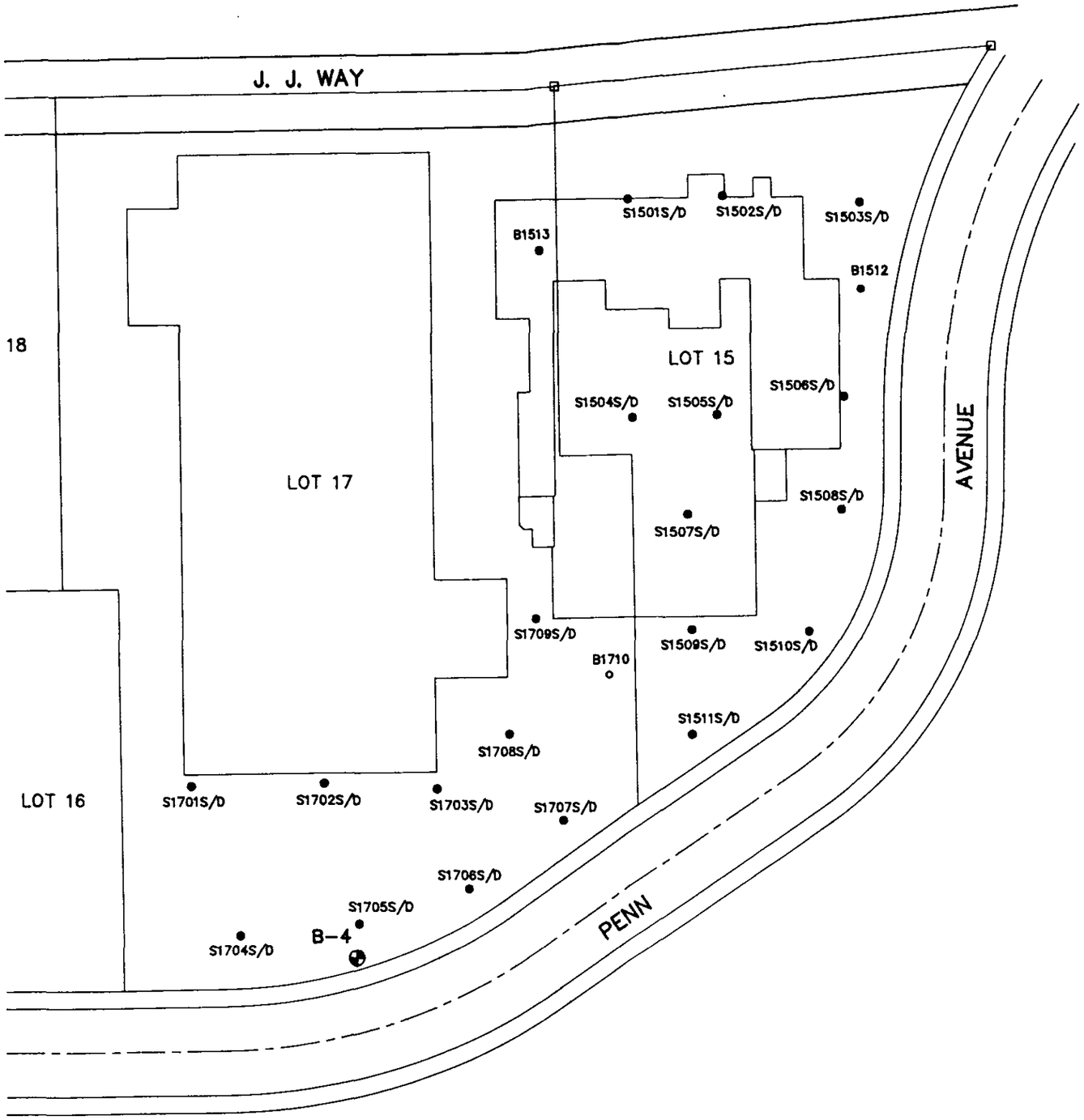
Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure
Prepared by: M.J.V.	Scale: SHOWN	20
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B20		

ORIGINAL (Red)



N

LEGEND

B-4 ●	MONITORING WELL LOCATION AND IDENTIFICATION (INSTALLED BY OTHERS)
S1501S ●	SOIL SAMPLE LOCATION AND IDENTIFICATION
B1710 ○	SOIL SAMPLE NOT COLLECTED
⊡	MONUMENT LOCATION
———	LOT BOUNDARY LINE

50' 0 50'

Title:

SOIL SAMPLE LOCATIONS FOR LOTS 15 AND 17

MARCUS HOOK, PENNSYLVANIA

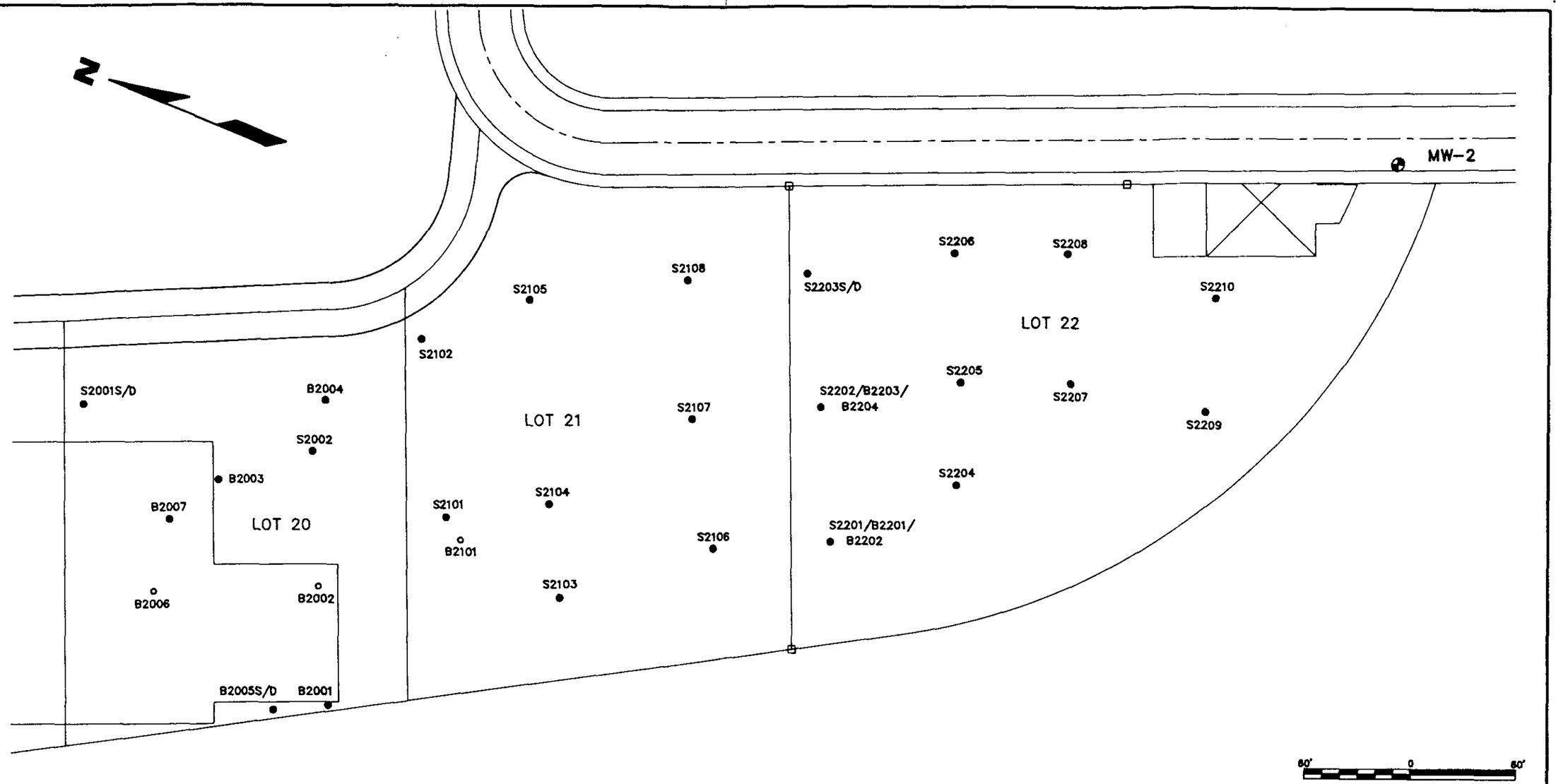
Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure
Prepared by: M.J.V.	Scale: SHOWN	21
Project Mgr: G.D.M.	Revision:	
File No. 01411J--B21		

ORIGINAL
(Red)



LEGEND

MW-2 ⊕	MONITORING WELL LOCATION AND IDENTIFICATION (INSTALLED BY ROUX ASSOCIATES, INC.)
S2001S ●	SOIL SAMPLE LOCATION AND IDENTIFICATION
B2002 ○	SOIL SAMPLE NOT COLLECTED
⊡	MONUMENT LOCATION
———	LOT BOUNDARY LINE

Title:

SOIL SAMPLE LOCATIONS FOR LOTS 20 – 22

MARCUS HOOK, PENNSYLVANIA

Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure
Prepared by: M.J.V.	Scale: SHOWN	
Project Mgr: G.D.M.	Revision:	22
File No. 01411J-B22		

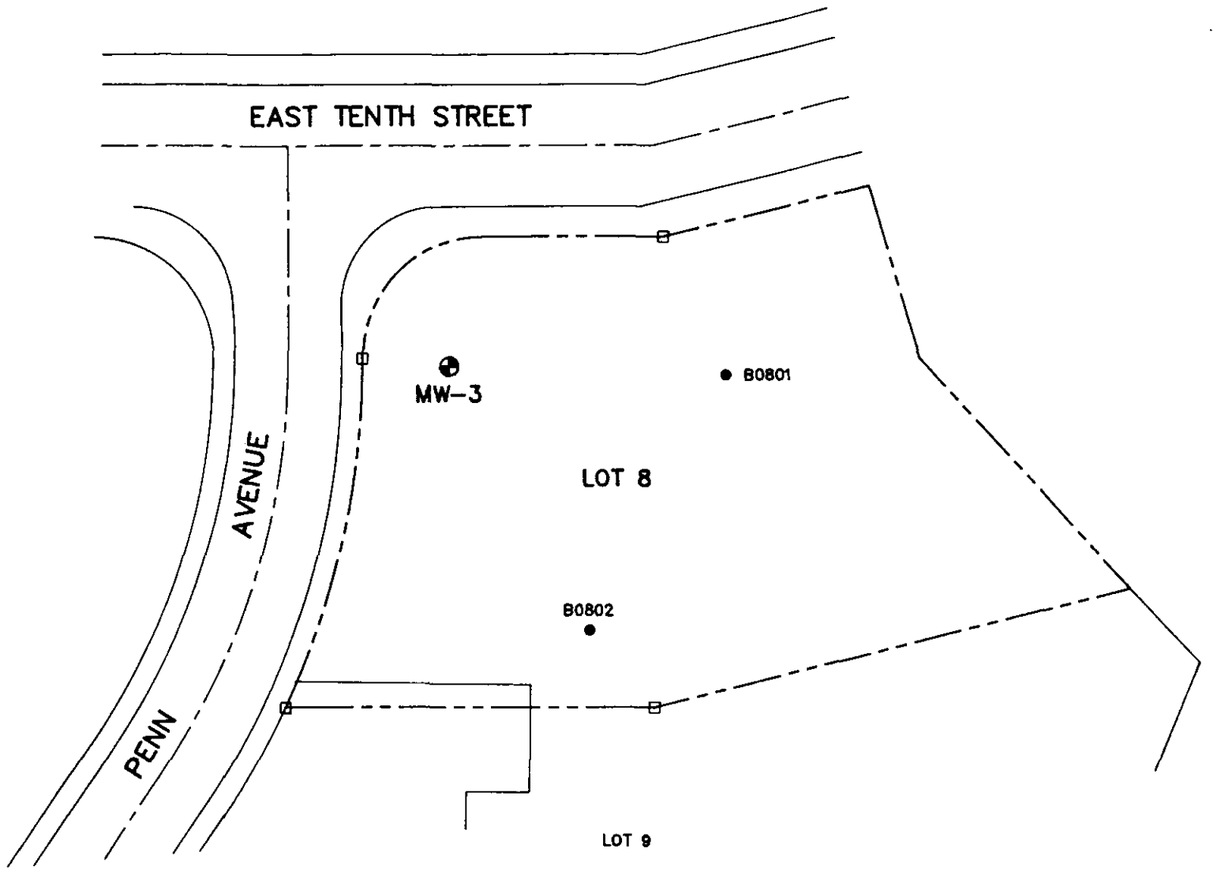
ORIGINAL
(Red)

N

ANALYTICAL RESULTS

SOIL SAMPLING POINT NO.	TOTAL VOLATILES (mg/kg)	TOTAL BASE-NEUTRALS (mg/kg)	TOTAL PCBs (mg/kg)	TOTAL PHENOLs (mg/kg)	TPH (mg/kg)	TOC (mg/kg)	ASBESTOS (%)
B0801	0.07 BJ	NA	< 0.02	NA	NA	NA	ND
B0802	0.016 BJ	NA	1.2	NA	1,420	NA	< 1%

NA: NOT ANALYZED
ND: NOT DETECTED
B: DETECTED IN METHOD BLANK
J: DETECTED BELOW METHOD DETECTION LIMIT



LEGEND

MW-3 ⊕ MONITORING WELL LOCATION AND IDENTIFICATION

B0801 ● SOIL SAMPLE LOCATION AND IDENTIFICATION

⊡ MONUMENT LOCATION

LOT BOUNDARY LINE

50' 0 50'

Title:
LOT 8
SUMMARY OF SOIL ANALYTICAL RESULTS

MARCUS HOOK, PENNSYLVANIA

Prepared for:
FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

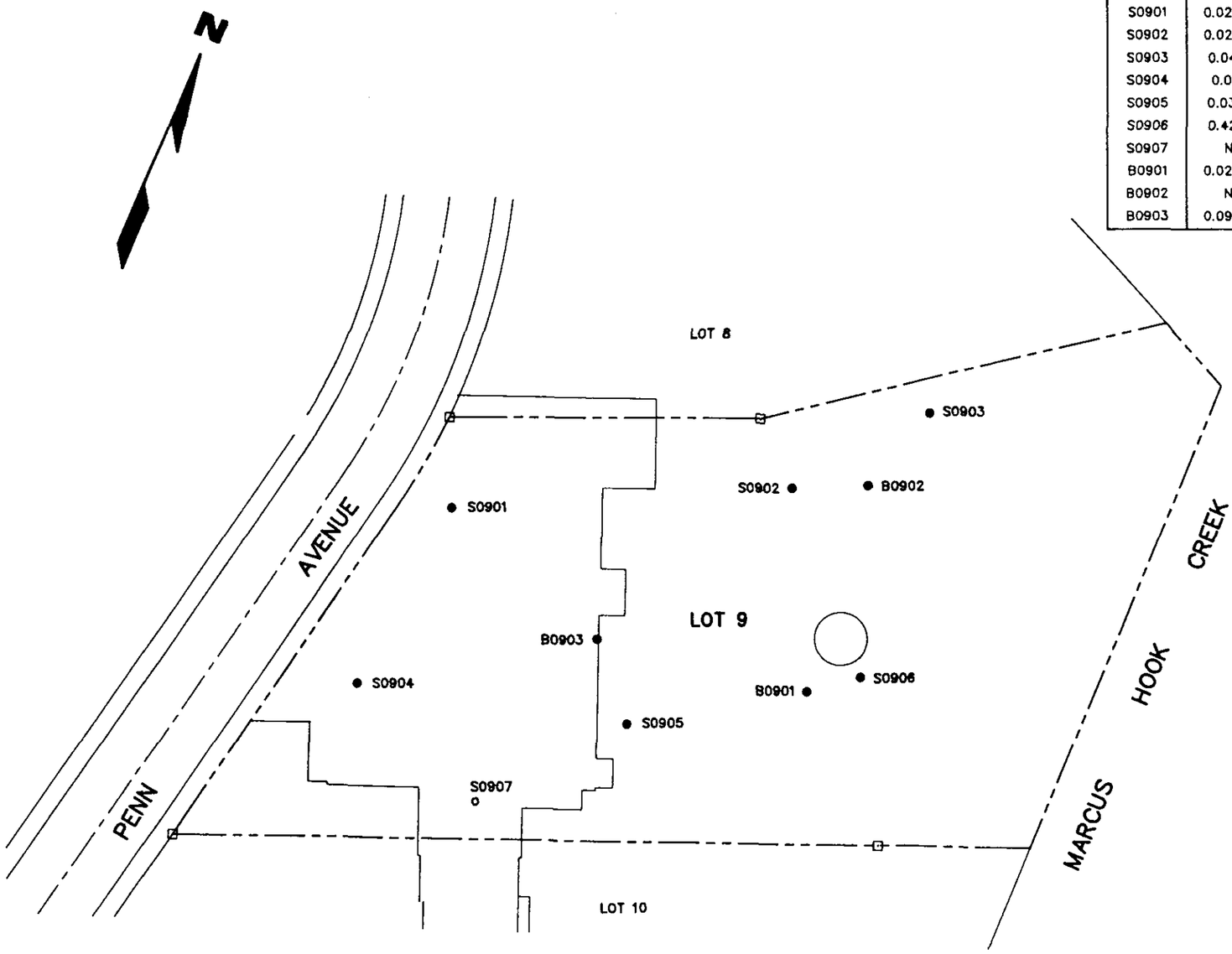
Compiled by: P.J.P.	Date: 11/92	Figure
Prepared by: M.J.V.	Scale: SHOWN	23
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B28		

ORIGINAL
(Red)

ANALYTICAL RESULTS

SOIL SAMPLING POINT NO.	TOTAL VOLATILES (mg/kg)	TOTAL BASE-NEUTRALS (mg/kg)	TOTAL PCBs (mg/kg)	TOTAL PHENOLs (mg/kg)	TPH (mg/kg)	TOC (mg/kg)	ASBESTOS (%)
S0901	0.025 BJ	NA	0.088	NA	NA	NA	< 1
S0902	0.027 BJ	NA	0.041	NA	NA	NA	< 1
S0903	0.041 B	NA	0.13	NA	NA	NA	< 1
S0904	0.07 B	NA	1.3	NA	NA	NA	ND
S0905	0.035 B	NA	0.88	NA	NA	NA	< 1
S0906	0.42 BJ	NA	< 0.2	NA	60,500	NA	< 1
S0907	NS	NS	NS	NS	NS	NS	NS
B0901	0.025 BJ	57 JX	2.3	NA	65,500	NA	3-5
B0902	NA	NA	NA	NA	NA	NA	6-8
B0903	0.094 BJ	NA	0.58	NA	364	NA	NA

NA: NOT ANALYZED
NS: NOT SAMPLED
ND: NOT DETECTED
B: DETECTED IN METHOD BLANK
J: DETECTED BELOW METHOD DETECTION LIMIT
X: SEE THE ANALYTICAL REPORTS FOR ADDITIONAL QA/QC FOOTNOTES.



LEGEND

B0901 ● SOIL SAMPLING LOCATION AND IDENTIFICATION

S0907 ○ SOIL SAMPLE NOT COLLECTED DUE TO REFUSAL

⊡ MONUMENT LOCATION

——— LOT BOUNDARY LINE

50' 0 50'

Title:

LOT 9
SUMMARY OF SOIL ANALYTICAL RESULTS

MARCUS HOOK, PENNSYLVANIA

Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

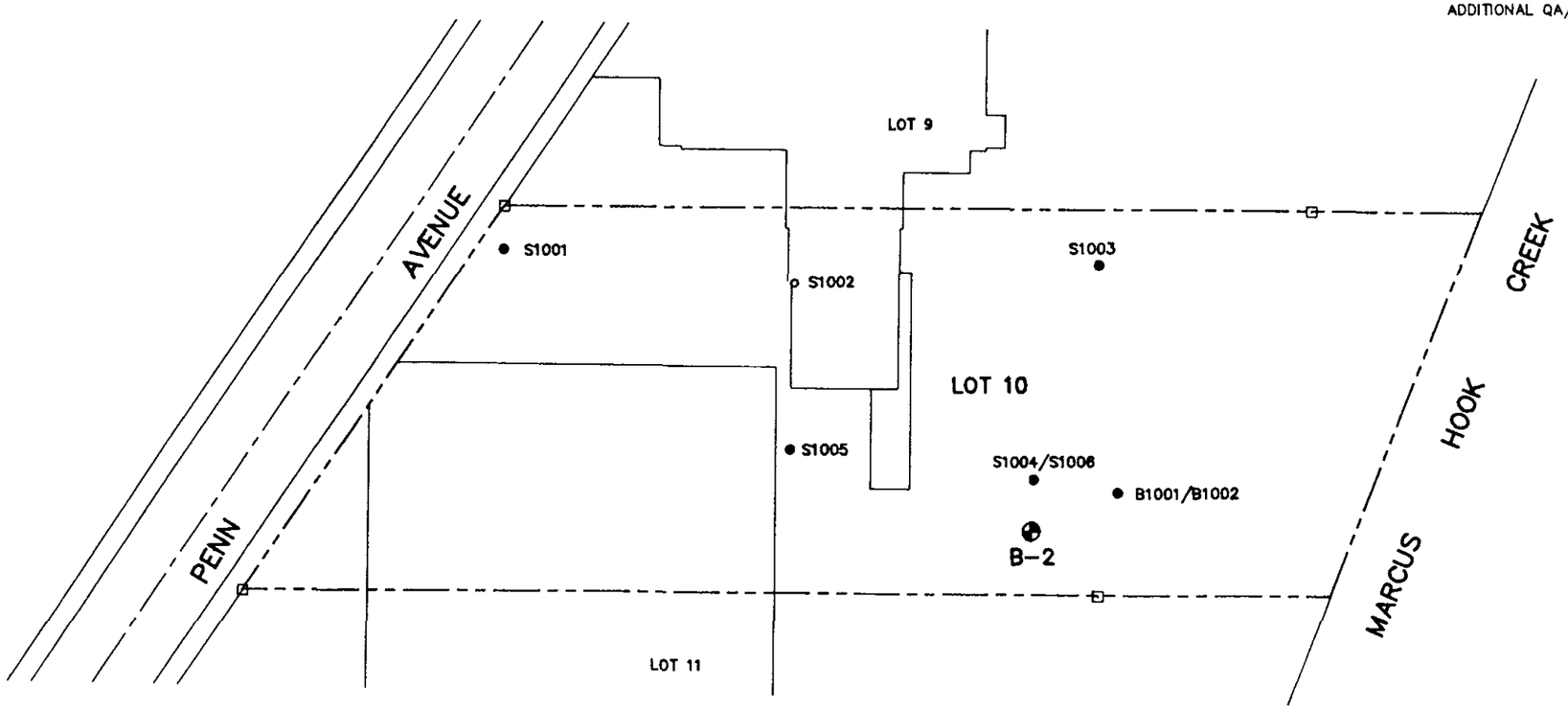
Compiled by: P.J.P.	Date: 11/92	Figure
Prepared by: M.J.V.	Scale: SHOWN	24
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B29		

ORIGINAL

ANALYTICAL RESULTS

SOIL SAMPLING POINT NO.	TOTAL VOLATILES (mg/kg)	TOTAL BASE-NEUTRALS (mg/kg)	TOTAL PCBs (mg/kg)	TOTAL PHENOLs (mg/kg)	TPH (mg/kg)	TOC (mg/kg)	ASBESTOS (%)
S1001	0.039 B	NA	0.1	NA	NA	NA	ND
S1002	NS	NS	NS	NS	NS	NS	NS
S1003	0.068 B	NA	< 0.2	NA	NA	NA	ND
S1004	0.044 BJ	NA	< 0.02	NA	NA	NA	ND
S1005	0.054 B	NA	< 0.2	NA	NA	NA	ND
S1006	NA	NA	NA	NA	NA	6,106	NA
B1001	0.012 BJ	29.9 JX	2.3	0.11	NA	NA	NA
B1002	0.077 B	NA	0.15	NA	NA	NA	NA

NA: NOT ANALYZED
NS: NOT SAMPLED
ND: NOT DETECTED
B: DETECTED IN METHOD BLANK
J: DETECTED BELOW METHOD DETECTION LIMIT
X: SEE THE ANALYTICAL REPORTS FOR ADDITIONAL QA/QC FOOTNOTES.



LEGEND

- B-2 — MONITORING WELL LOCATION AND IDENTIFICATION
- S1001 — SOIL SAMPLE LOCATION AND IDENTIFICATION
- S1002 — SOIL SAMPLE NOT COLLECTED DUE TO REFUSAL
- MONUMENT LOCATION
- LOT BOUNDARY LINE

50' 0 50'

Title:

LOT 10 SUMMARY OF SOIL ANALYTICAL RESULTS

MARCUS HOOK, PENNSYLVANIA

Prepared for:

FMC CORPORATION

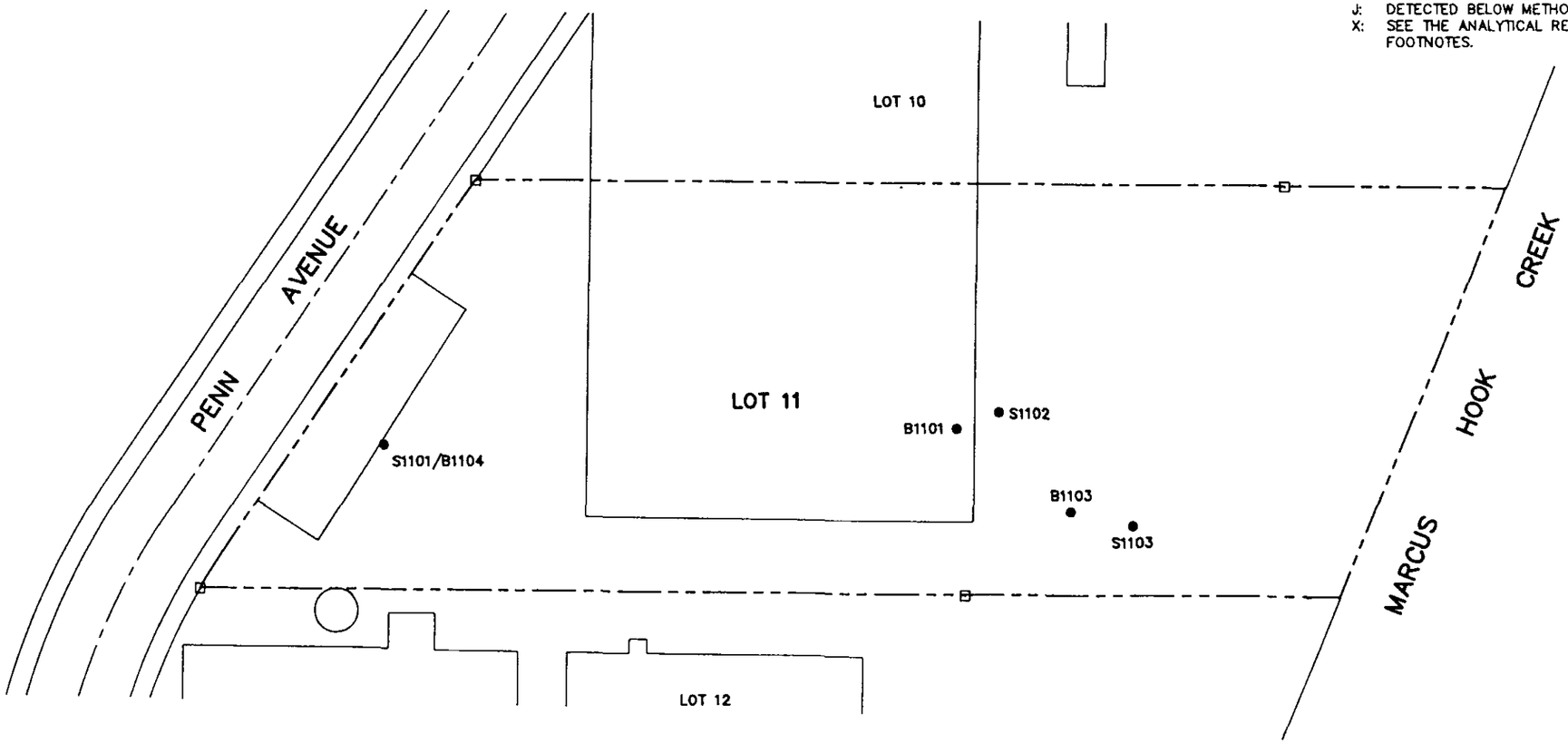
ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: T.L.T.	Date: 10/92	Figure
Prepared by: M.J.V.	Scale: SHOWN	25
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B30		

ANALYTICAL RESULTS

SOIL SAMPLING POINT NO.	TOTAL VOLATILES (mg/kg)	TOTAL BASE-NEUTRALS (mg/kg)	TOTAL PCBs (mg/kg)	TOTAL PHENOLs (mg/kg)	TPH (mg/kg)	TOC (mg/kg)	ASBESTOS (%)
S1101	0.136 B	NA	< 0.02	NA	NA	NA	ND
S1102	0.049 BJ	NA	< 0.02	NA	NA	NA	ND
S1103	0.042 BJ	NA	< 0.02	NA	NA	NA	ND
B1101	0.212 B	NA	NA	NA	NA	NA	NA
B1103	0.512 BE	15.677 BJX	2.3	< 0.10	NA	NA	NA
B1104	2.34 BJ	NA	< 0.02	NA	14,100	NA	NA

NA: NOT ANALYZED.
ND: NOT DETECTED.
B: DETECTED IN METHOD BLANK.
E: SAMPLE WHICH CONTAINED COMPOUND WHOSE CONCENTRATION EXCEEDED THE CALIBRATION RANGE OF THE GC/MS INSTRUMENT.
J: DETECTED BELOW METHOD DETECTION LIMIT.
X: SEE THE ANALYTICAL REPORTS FOR ADDITIONAL QA/QC FOOTNOTES.



LEGEND

S1101 ● SOIL SAMPLE LOCATION AND IDENTIFICATION

⊡ MONUMENT LOCATION

LOT BOUNDARY LINE

50' 0 50'

Title:

LOT 11 SUMMARY OF SOIL ANALYTICAL RESULTS

MARCUS HOOK, PENNSYLVANIA

Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

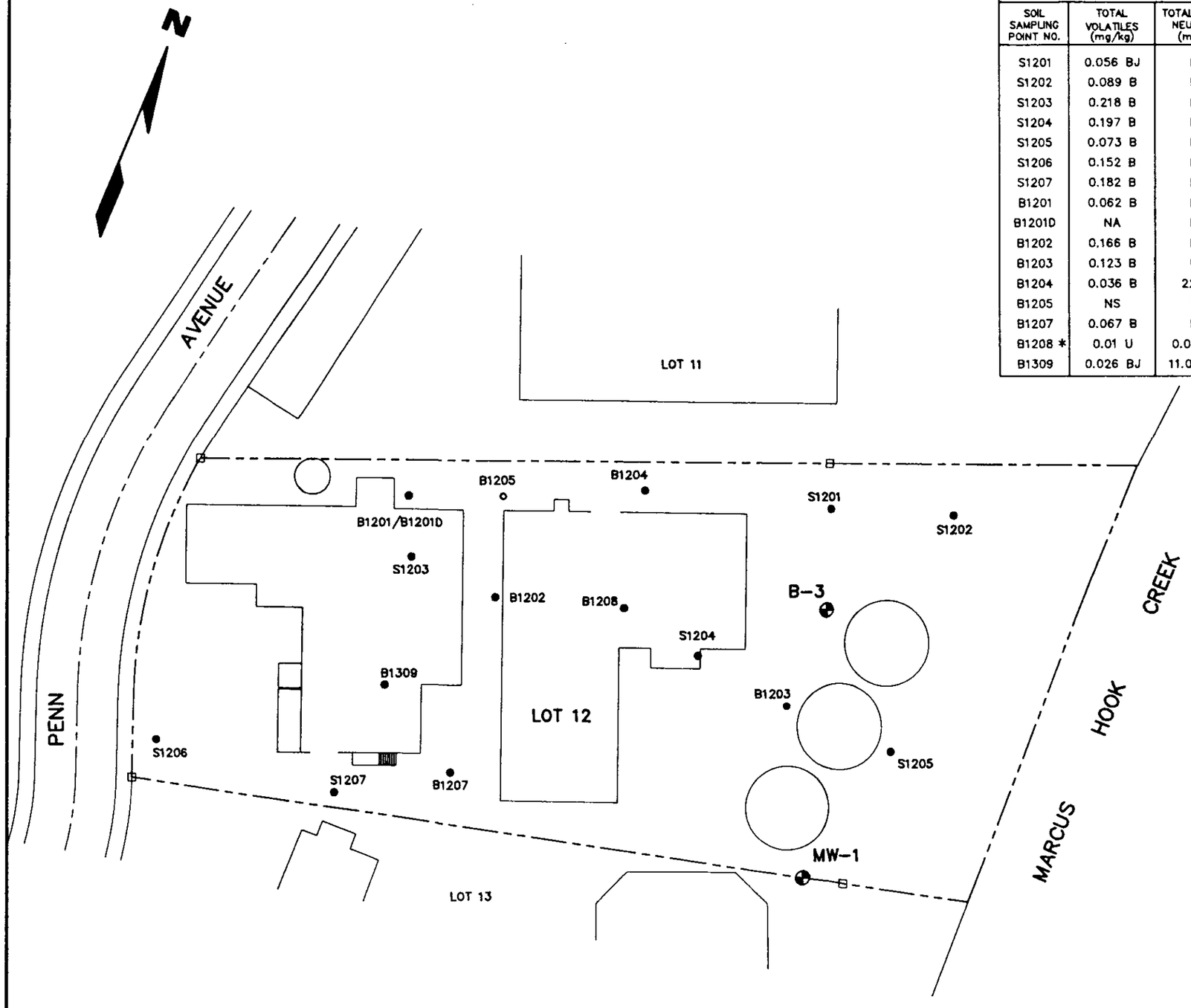
Compiled by: P.J.P.	Date: 11/92	Figure
Prepared by: M.J.V.	Scale: SHOWN	26
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B31		

ORIGINAL (Red.

ANALYTICAL RESULTS

SOIL SAMPLING POINT NO.	TOTAL VOLATILES (mg/kg)	TOTAL BASE-NEUTRALS (mg/kg)	TOTAL PCBs (mg/kg)	TOTAL PHENOLs (mg/kg)	TPH (mg/kg)	TOC (mg/kg)	ASBESTOS (%)
S1201	0.056 BJ	NA	< 0.02	NA	NA	NA	ND
S1202	0.089 B	NA	< 0.02	NA	NA	NA	ND
S1203	0.218 B	NA	< 0.0002	NA	NA	NA	< 1
S1204	0.197 B	NA	0.46	NA	NA	NA	ND
S1205	0.073 B	NA	< 0.02	NA	NA	NA	ND
S1206	0.152 B	NA	2.1	NA	NA	NA	ND
S1207	0.182 B	NA	< 0.2	NA	NA	NA	ND
B1201	0.062 B	NA	< 0.02	NA	NA	NA	NA
B1201D	NA	NA	NA	NA	NA	928	NA
B1202	0.166 B	NA	NA	NA	NA	NA	NA
B1203	0.123 B	NA	2.3	NA	NA	NA	NA
B1204	0.036 B	22.24	2.4	0.11	NA	NA	NA
B1205	NS	NS	NS	NS	NS	NS	NS
B1207	0.067 B	NA	0.44	NA	2,050	NA	NA
B1208 *	0.01 U	0.013 BJ	0.001	< 0.010	NA	NA	NA
B1309	0.026 BJ	11.087 BJ	0.47	< 0.10	NA	NA	NA

NA: NOT ANALYZED
NS: NOT SAMPLED
B: DETECTED IN METHOD BLANK
J: DETECTED BELOW METHOD DETECTION LIMIT
U: NOT DETECTED
*: AQUEOUS SAMPLE, RESULTS REPORTED IN mg/l



LEGEND

- MW-1 ⊕ MONITORING WELL LOCATION AND IDENTIFICATION
- S1201 ● SOIL SAMPLE LOCATION AND IDENTIFICATION
- B1205 ○ SOIL SAMPLE NOT COLLECTED DUE TO REFUSAL
- ⊡ MONUMENT LOCATION
- LOT BOUNDARY LINE

50' 0 50'

Title:

LOT 12 SUMMARY OF SOIL ANALYTICAL RESULTS

MARCUS HOOK, PENNSYLVANIA

Prepared for:

FMC CORPORATION

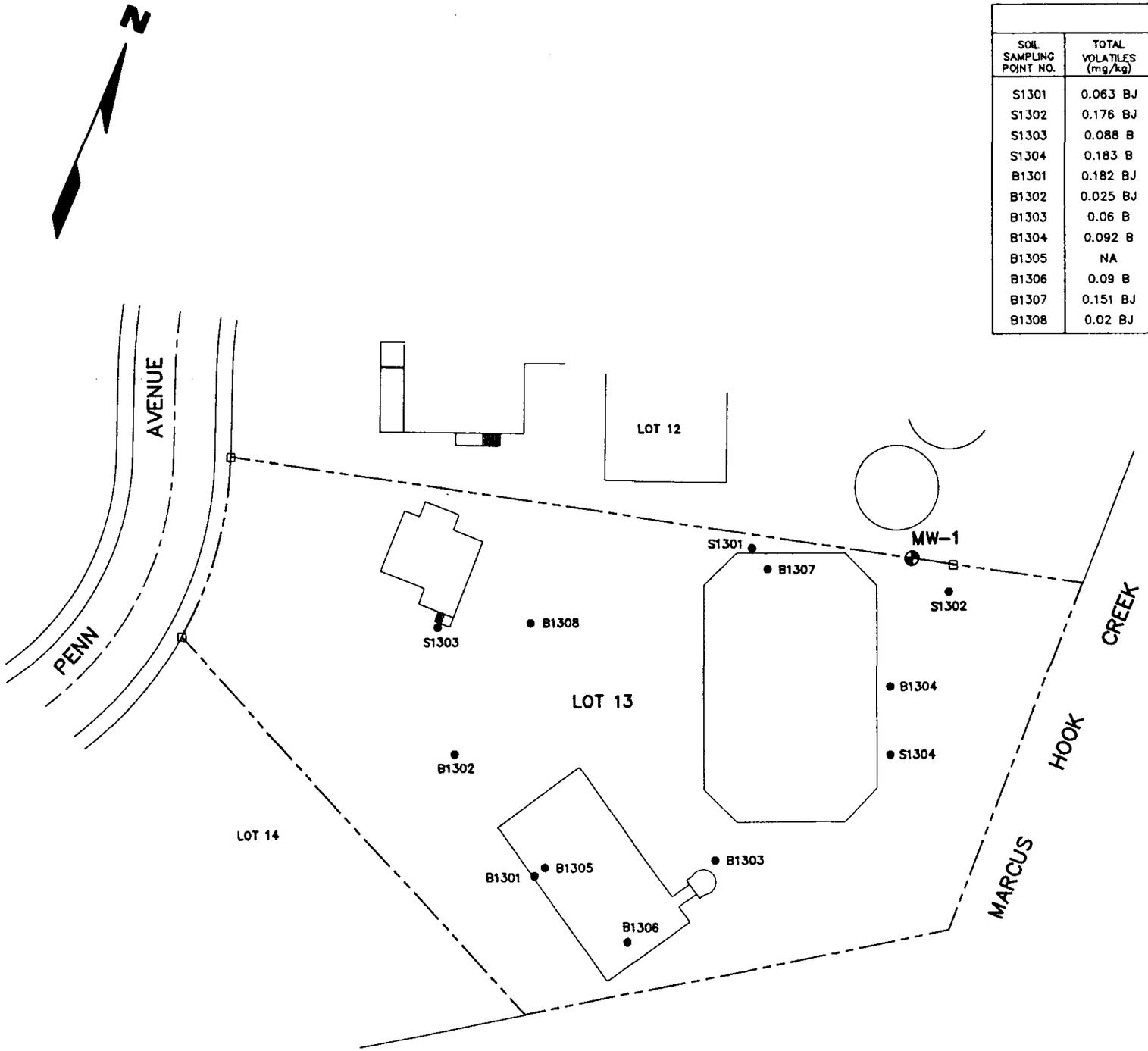
ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure
Prepared by: M.J.V.	Scale: SHOWN	27
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B32		

ORIGINAL (Red)

ANALYTICAL RESULTS							
SOIL SAMPLING POINT NO.	TOTAL VOLATILES (mg/kg)	TOTAL BASE-NEUTRALS (mg/kg)	TOTAL PCBs (mg/kg)	TOTAL PHENOLs (mg/kg)	TPH (mg/kg)	TOC (mg/kg)	ASBESTOS (%)
S1301	0.063 BJ	NA	< 0.39	NA	NA	NA	ND
S1302	0.176 BJ	NA	0.16	NA	NA	NA	< 1
S1303	0.088 B	NA	8.5	NA	NA	NA	ND
S1304	0.183 B	NA	< 0.02	NA	NA	NA	ND
B1301	0.182 BJ	NA	1.7	NA	NA	NA	< 1
B1302	0.025 BJ	NA	60	NA	NA	NA	< 1
B1303	0.06 B	NA	0.31	NA	NA	NA	NA
B1304	0.092 B	NA	NA	NA	NA	NA	NA
B1305	NA	NA	1.1	NA	NA	NA	NA
B1306	0.09 B	NA	5.8	NA	NA	NA	NA
B1307	0.151 BJ	NA	2.2	NA	NA	NA	NA
B1308	0.02 BJ	NA	63	NA	2,370	NA	NA

NA: NOT ANALYZED
ND: NOT DETECTED
B: DETECTED IN METHOD BLANK
J: DETECTED BELOW METHOD DETECTION LIMIT



LEGEND

- MW-1 ⊕ MONITORING WELL LOCATION AND IDENTIFICATION
- S1301 ● SOIL SAMPLE LOCATION AND IDENTIFICATION
- ⊡ MONUMENT LOCATION
- LOT BOUNDARY LINE

50' 0 50'

Title:

LOT 13 SUMMARY OF SOIL ANALYTICAL RESULTS

MARCUS HOOK, PENNSYLVANIA

Prepared for:

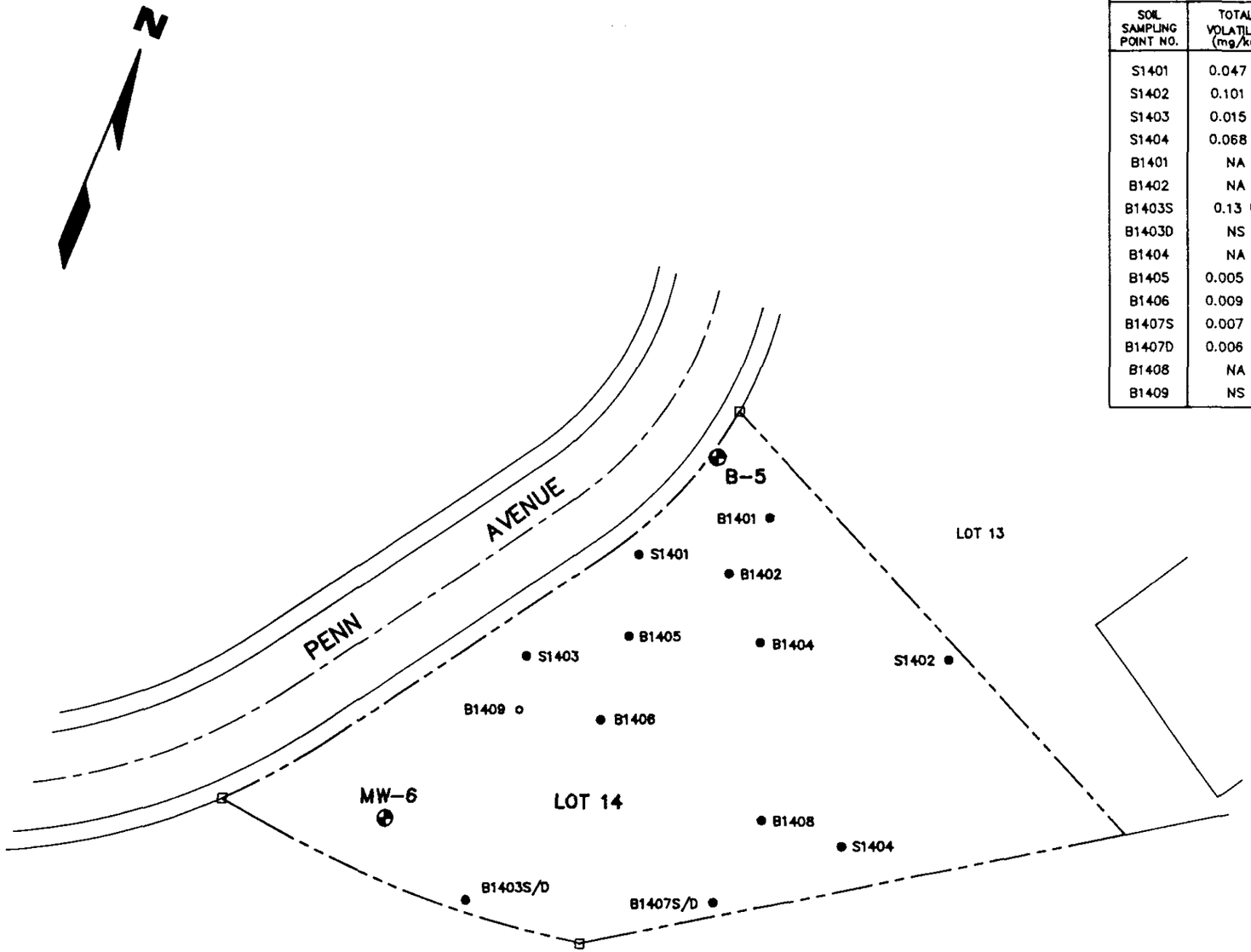
FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92
Prepared by: M.J.V.	Scale: SHOWN
Project Mgr: G.D.M.	Revision:
File No. 01411J-B33	

Figure 28

ORIGINAL
(Red)



ANALYTICAL RESULTS

SOIL SAMPLING POINT NO.	TOTAL VOLATILES (mg/kg)	TOTAL BASE-NEUTRALS (mg/kg)	TOTAL PCBs (mg/kg)	TOTAL PHENOLs (mg/kg)	TPH (mg/kg)	TOC (mg/kg)	ASBESTOS (%)
S1401	0.047 B	NA	0.4	NA	NA	NA	ND
S1402	0.101 B	NA	15	NA	NA	NA	ND
S1403	0.015 B	NA	0.049	NA	NA	NA	ND
S1404	0.068 B	NA	< 0.02	NA	NA	NA	ND
B1401	NA	NA	NA	NA	280	NA	NA
B1402	NA	NA	NA	NA	106	NA	NA
B1403S	0.13 B	0.422 BJ	< 0.02	< 0.10	< 25	NA	ND
B1403D	NS	NS	NS	NS	NS	NS	NS
B1404	NA	NA	NA	NA	30.5	NA	ND
B1405	0.005 BJ	9.51 BJ	60	< 0.10	478	NA	3
B1406	0.009 BJ	0.86 B	< 0.02	< 0.10	< 25	NA	ND
B1407S	0.007 BJ	1.588 BJ	< 0.02	< 0.10	< 25	NA	ND
B1407D	0.006 BJ	0.767 BJ	< 0.02	< 0.10	< 25	NA	ND
B1408	NA	NA	0.049	NA	73.7	NA	ND
B1409	NS	NS	NS	NS	NS	NS	NS

NA: NOT ANALYZED
NS: NOT SAMPLED
ND: NOT DETECTED
B: DETECTED IN METHOD BLANK
J: DETECTED BELOW METHOD DETECTION LIMIT

LEGEND

- B-5 ⊕ MONITORING WELL LOCATION AND IDENTIFICATION
- S1401 ● SOIL SAMPLE LOCATION AND IDENTIFICATION
- B1409 ○ SOIL SAMPLE NOT COLLECTED DUE TO REFUSAL
- ⊡ MONUMENT LOCATION
- LOT BOUNDARY LINE

50' 0 50'

Title:

LOT 14 SUMMARY OF SOIL ANALYTICAL RESULTS

MARCUS HOOK, PENNSYLVANIA

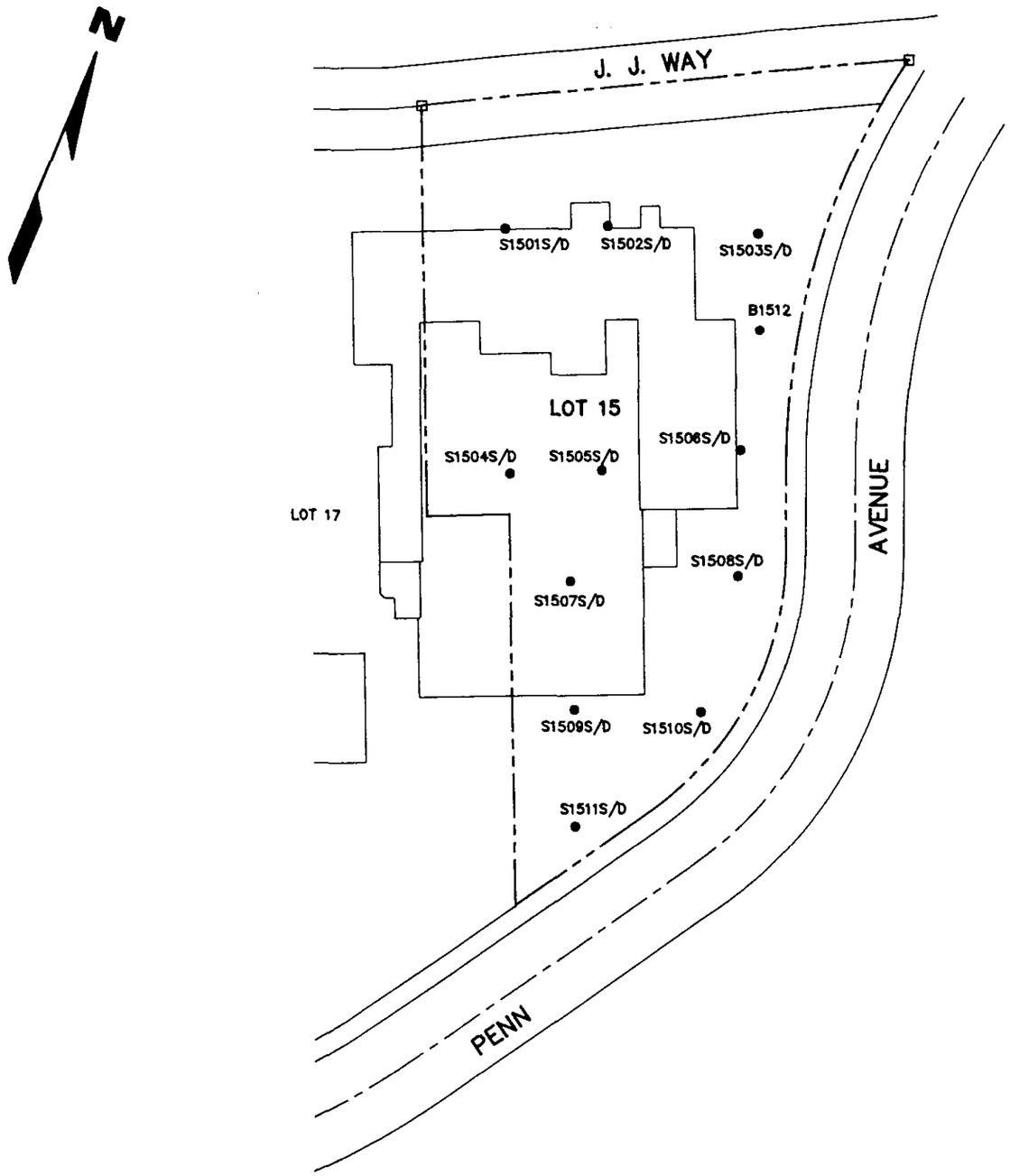
Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure
Prepared by: M.J.V.	Scale: SHOWN	
Project Mgr: G.D.M.	Revision:	29
File No. 01411J-B34		

ORIGINAL
(Red)



ANALYTICAL RESULTS

SOIL SAMPLING POINT NO.	TOTAL VOLATILES (mg/kg)	TOTAL BASE-NEUTRALS (mg/kg)	TOTAL PCBs (mg/kg)	TOTAL PHENOLs (mg/kg)	TPH (mg/kg)	TOC (mg/kg)	ASBESTOS (%)
S1501S	0.025 BJ	0.81 J	< 0.02	0.21	59	NA	NA
S1501D	0.004 BJ	0.43 B	< 0.02	< 0.10	< 25	NA	NA
S1502S	0.063 B	1.37 BJX	< 0.02	< 0.10	106	NA	NA
S1502D	NS	NS	NS	NS	NS	NS	NS
S1503S	0.017 BJ	2.41 BJ	< 0.02	1.74	7,900	NA	NA
S1503D	NS	NS	NS	NS	NS	NS	NS
S1504S	NA	NA	87	NA	7,300	NA	NA
S1504D	NS	NS	NS	NS	NS	NS	NS
S1505S	NA	NA	0.9	NA	340	NA	NA
S1505D	NA	NA	1.4	NA	698	NA	NA
S1506S	NA	NA	2.1	NA	1,320	NA	NA
S1506D	NA	NA	< 0.02	NA	< 25	NA	NA
S1507S	NA	NA	8.1	NA	1,540	NA	NA
S1507D	NA	NA	27	NA	7,130	NA	NA
S1508S	NA	NA	0.39	NA	157	NA	NA
S1508D	NA	NA	< 0.02	NA	< 25	NA	NA
S1509S	NA	NA	7.6	NA	1,810	NA	NA
S1509D	NA	NA	< 0.02	NA	< 25	NA	NA
S1510S	NA	NA	1.1	NA	265	NA	NA
S1510D	NA	NA	0.22	NA	596	NA	NA
S1511S	NA	NA	0.69	NA	508	NA	NA
S1511D	NA	NA	< 0.02	NA	< 25	NA	NA
B1512	0.025 B	0.596 BJ	0.14	< 0.10	NA	NA	NA

NA: NOT ANALYZED.
NS: NOT SAMPLED
B: DETECTED IN METHOD BLANK.
J: DETECTED BELOW METHOD DETECTION LIMIT.
X: SEE THE ANALYTICAL REPORTS FOR ADDITIONAL QA/QC FOOTNOTES.

50' 0 50'

LEGEND

S1501S/D ● SOIL SAMPLE LOCATION AND IDENTIFICATION

⊡ MONUMENT LOCATION

LOT BOUNDARY LINE

Title:

LOT 15
SUMMARY OF SOIL ANALYTICAL RESULTS

MARCUS HOOK, PENNSYLVANIA

Prepared for:

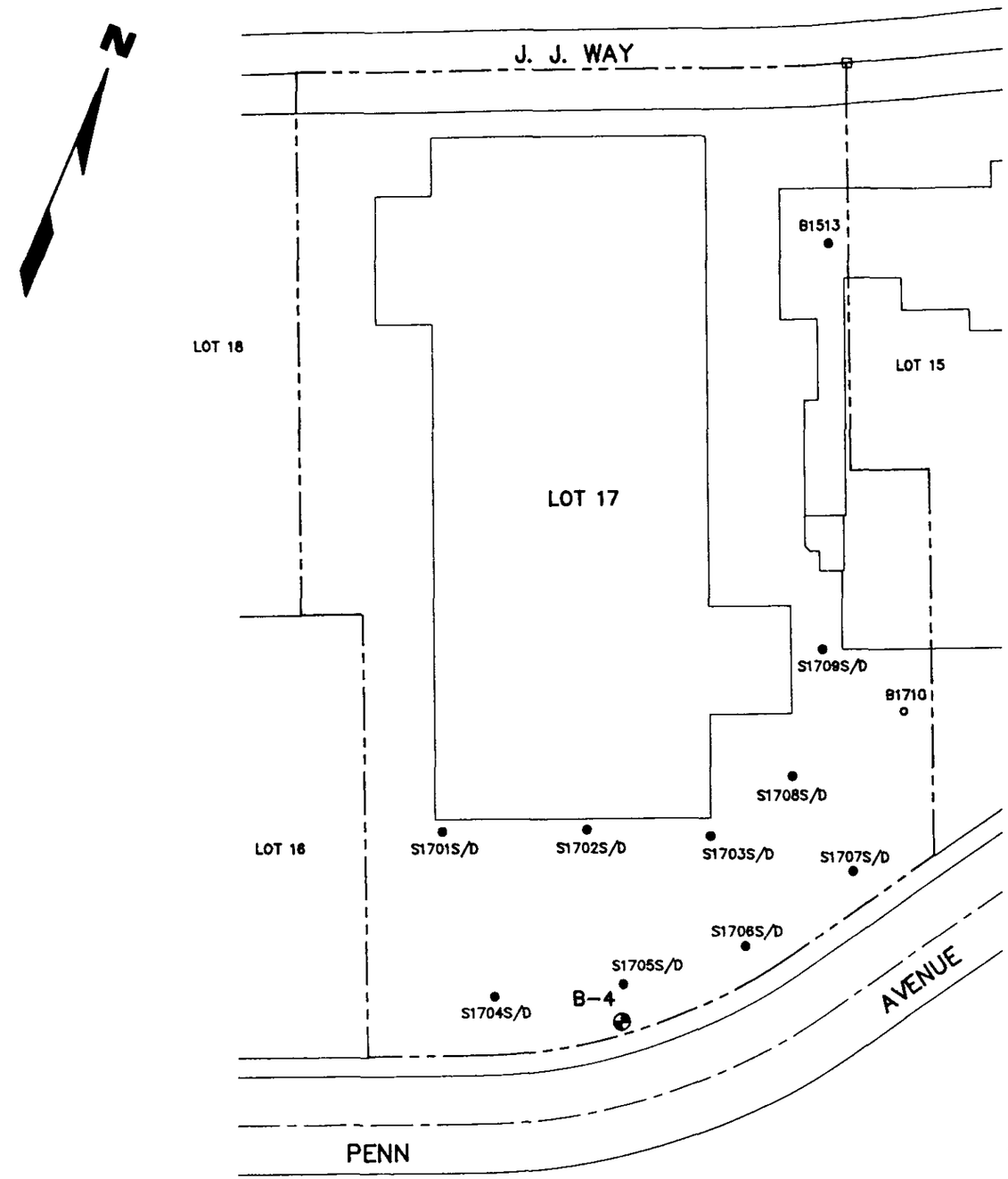
FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92
Prepared by: M.J.V.	Scale: SHOWN
Project Mgr: G.D.M.	Revision:
File No. 01411J-B35	

Figure 30

ORIGINAL
(Red)



ANALYTICAL RESULTS							
SOIL SAMPLING POINT NO.	TOTAL VOLATILES (mg/kg)	TOTAL BASE-NEUTRALS (mg/kg)	TOTAL PCBs (mg/kg)	TOTAL PHENOLs (mg/kg)	TPH (mg/kg)	TOC (mg/kg)	ASBESTOS (%)
B1513	0.032 B	0.81 J	20	0.14	NA	NA	NA
S1701S	0.019 B	7.281 BJX	0.022	0.13	500	NA	NA
S1701D	0.013 B	1.919 BJX	< 0.02	< 0.10	< 25	NA	NA
S1702S	NA	NA	0.32	NA	< 25	NA	NA
S1702D	0.237 J	NA	< 0.02	NA	< 25	NA	NA
S1703S	NA	NA	400	NA	< 25	NA	NA
S1703D	NA	NA	< 0.02	NA	< 25	NA	NA
S1704S	NA	NA	0.041	NA	35	NA	NA
S1704D	NA	NA	< 0.02	NA	< 25	NA	NA
S1705S	NA	NA	14	NA	2,590	NA	NA
S1705D	NA	NA	< 0.02	NA	< 25	NA	NA
S1706S	NA	NA	4.5	NA	764	NA	NA
S1706D	NA	NA	< 0.02	NA	< 25	NA	NA
S1707S	NA	NA	0.2	NA	6,070	NA	NA
S1707D	NA	NA	< 0.02	NA	< 25	NA	NA
S1708S	NA	NA	0.034	NA	67	NA	NA
S1708D	NA	NA	< 0.02	NA	< 25	NA	NA
S1709S	NA	NA	4.4	NA	1,390	NA	NA
S1709D	0.084 B	NA	0.037	NA	1,360	NA	NA
B1710	NS	NS	NS	NS	NS	NS	NS

NA: NOT ANALYZED.
NS: NOT SAMPLED.
B: DETECTED IN METHOD BLANK.
J: DETECTED BELOW METHOD DETECTION LIMIT.
X: SEE THE ANALYTICAL REPORTS FOR ADDITIONAL QA/QC FOOTNOTES.

50' 0 50'

LEGEND

- B-4 — MONITORING WELL LOCATION AND IDENTIFICATION
- S1701S/D — SOIL SAMPLE LOCATION AND IDENTIFICATION
- B1710 — SOIL SAMPLE NOT COLLECTED DUE TO REFUSAL
- MONUMENT LOCATION
- LOT BOUNDARY LINE

Title:

LOT 17
SUMMARY OF SOIL ANALYTICAL RESULTS

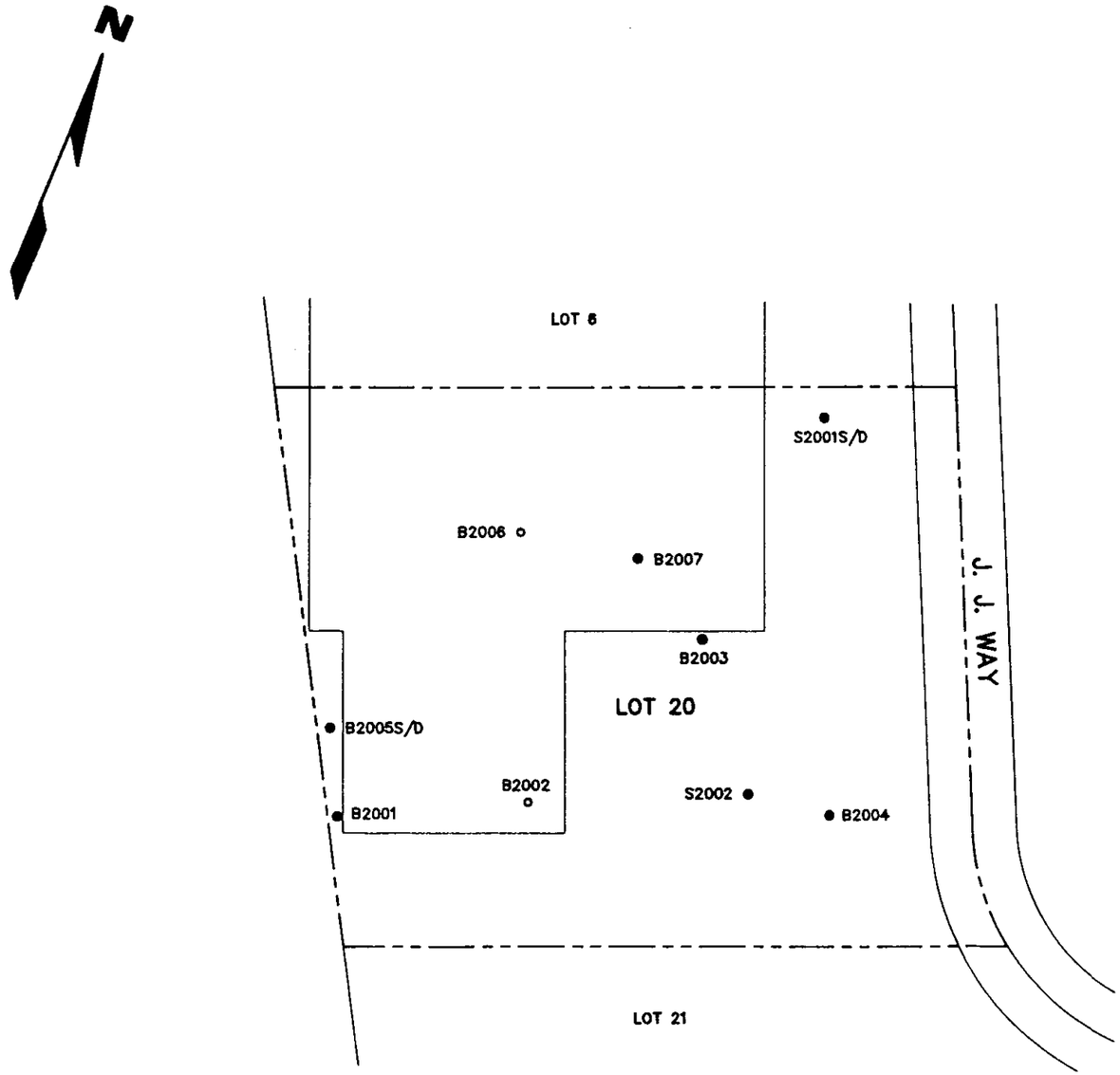
MARCUS HOOK, PENNSYLVANIA

Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure
Prepared by: M.J.V.	Scale: SHOWN	31
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B36		



ANALYTICAL RESULTS

SOIL SAMPLING POINT NO.	TOTAL VOLATILES (mg/kg)	TOTAL BASE-NEUTRALS (mg/kg)	TOTAL PCBs (mg/kg)	TOTAL PHENOLs (mg/kg)	TPH (mg/kg)	TOC (mg/kg)	ASBESTOS (%)
S2001S	0.131 BJ	NA	NA	NA	637	NA	NA
S2001D	1.323 BJ	123.3 E	430	NA	46	NA	ND
S2002	0.058 B	NA	< 0.02	NA	NA	NA	ND
B2001	0.055 B	NA	< 0.02	NA	< 25	NA	NA
B2002	NS	NS	NS	NS	NS	NS	NS
B2003	NA	NA	0.18	NA	NA	NA	NA
B2004	0.033 B	NA	0.61	NA	NA	NA	55-65
B2005S	0.039 B	NA	< 0.02	NA	1,330	NA	NA
B2005D	0.053 B	NA	< 0.02	NA	< 25	NA	NA
B2006	NS	NS	NS	NS	NS	NS	NS
B2007	0.061 B	NA	0.206	NA	54,900	NA	NA

NA: NOT ANALYZED.
NS: NOT SAMPLED
ND: NOT DETECTED
B: DETECTED IN METHOD BLANK.
J: DETECTED BELOW METHOD DETECTION LIMIT.
E: SAMPLE WHICH CONTAINED COMPOUNDS WHOSE CONCENTRATION EXCEEDED THE CALIBRATION RANGE OF THE GC/MS INSTRUMENT.

LEGEND

S2001S/D ● SOIL SAMPLE LOCATION AND IDENTIFICATION

B2002 o SOIL SAMPLE NOT COLLECTED DUE TO REFUSAL

LOT BOUNDARY LINE

50' 0 50'

Title:

LOT 20 SUMMARY OF SOIL ANALYTICAL RESULTS

MARCUS HOOK, PENNSYLVANIA

Prepared for:

FMC CORPORATION

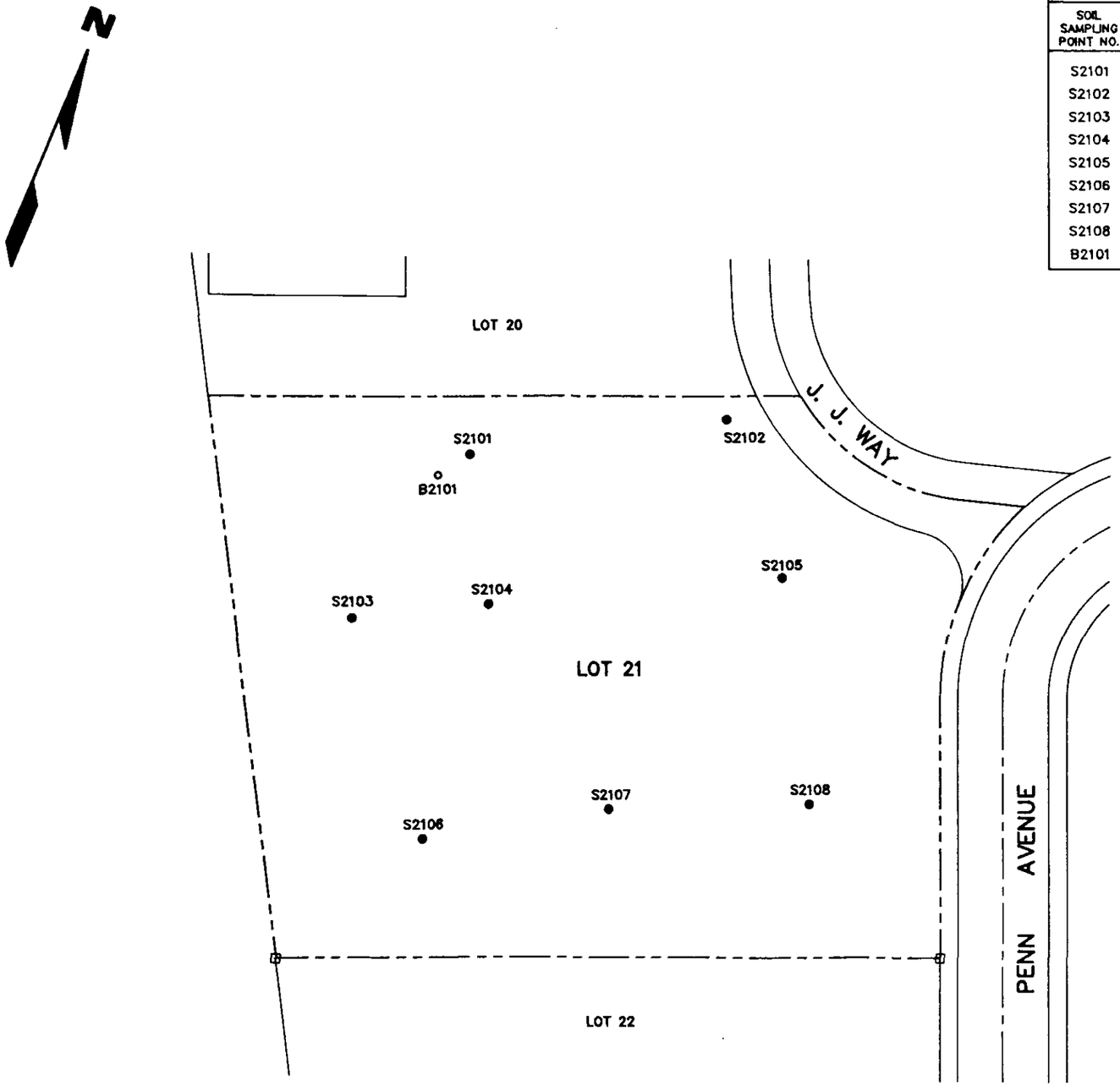
ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure
Prepared by: M.J.V.	Scale: SHOWN	32
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B37		

ORIGINAL
(Red)

ANALYTICAL RESULTS							
SOIL SAMPLING POINT NO.	TOTAL VOLATILES (mg/kg)	TOTAL BASE-NEUTRALS (mg/kg)	TOTAL PCBs (mg/kg)	TOTAL PHENOLs (mg/kg)	TPH (mg/kg)	TOC (mg/kg)	ASBESTOS (%)
S2101	0.045 B	NA	1.1	NA	NA	NA	2-4
S2102	0.087 B	NA	2.7	NA	NA	NA	1-2
S2103	0.055 B	NA	2.9	NA	NA	NA	1
S2104	0.141 B	NA	0.11	NA	NA	NA	3-5
S2105	0.176 B	NA	2.4	NA	NA	NA	3-5
S2106	0.046 B	NA	0.16	NA	NA	NA	< 1
S2107	0.048 B	NA	0.48	NA	NA	NA	ND
S2108	0.092 B	NA	0.72	NA	NA	NA	< 1
B2101	NS	NS	NS	NS	NS	NS	NS

NA: NOT ANALYZED.
NS: NOT SAMPLED
ND: NOT DETECTED
B: DETECTED IN METHOD BLANK.



LEGEND

- S2101 ● SOIL SAMPLE LOCATION AND IDENTIFICATION
- B2101 o SOIL SAMPLE NOT COLLECTED DUE TO REFUSAL
- ⊡ MONUMENT LOCATION
- LOT BOUNDARY LINE

50' 0 50'

Title:

LOT 21
SUMMARY OF SOIL ANALYTICAL RESULTS

MARCUS HOOK, PENNSYLVANIA

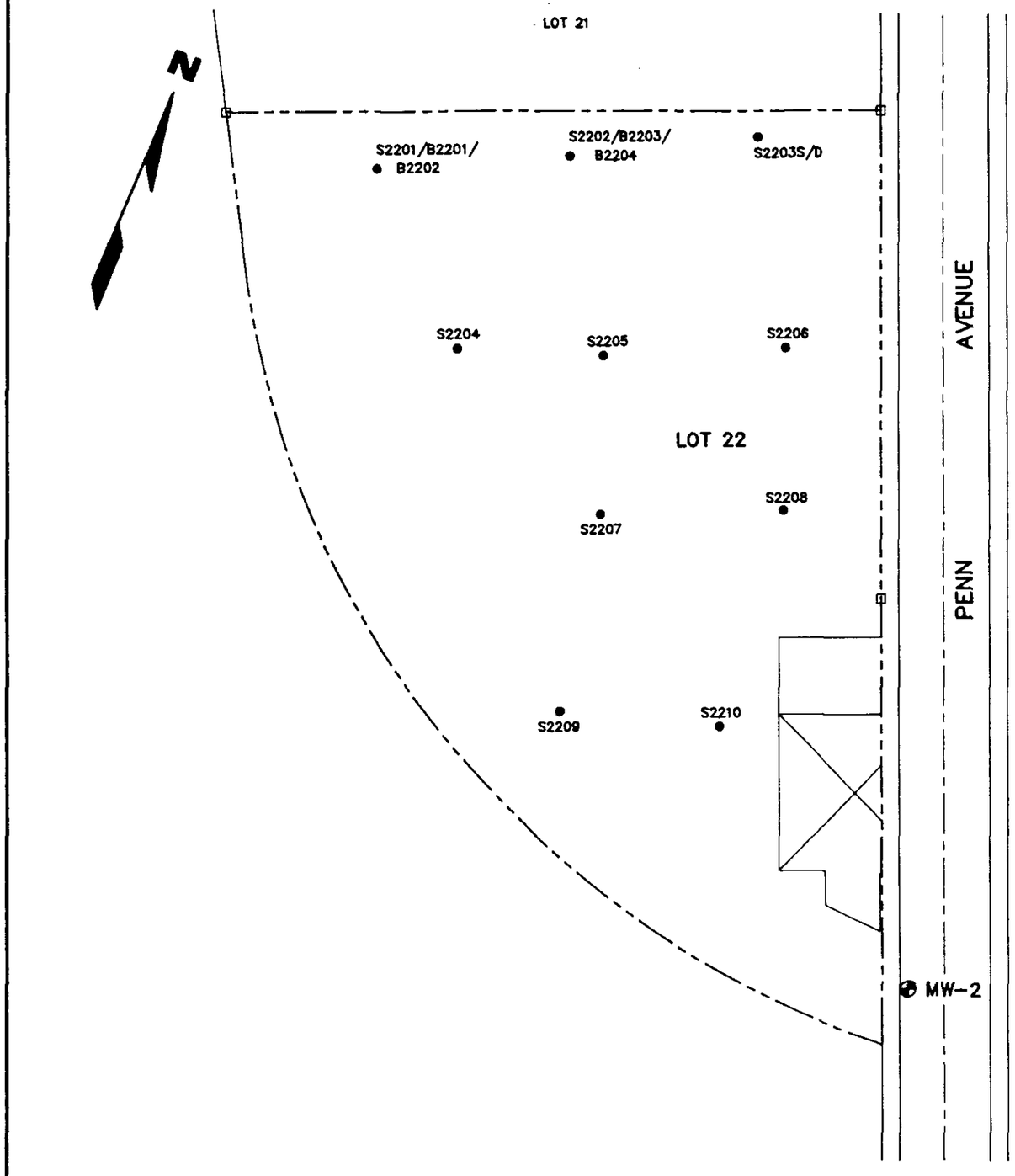
Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure
Prepared by: M.J.V.	Scale: SHOWN	33
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B38		

ORIGINAL
(Red)



ANALYTICAL RESULTS

SOIL SAMPLING POINT NO.	TOTAL VOLATILES (mg/kg)	TOTAL BASE-NEUTRALS (mg/kg)	TOTAL PCBs (mg/kg)	TOTAL PHENOLs (mg/kg)	TPH (mg/kg)	TOC (mg/kg)	ASBESTOS (%)
S2201	0.049 B	NA	1.6	NA	NA	NA	1-2
S2202	0.077 B	NA	0.23	NA	NA	NA	< 1
S2203S	0.045 B	NA	0.17	NA	NA	NA	< 1
S2203D	0.088 B	NA	NA	NA	NA	NA	NA
S2204	0.107 B	NA	< 0.02	NA	NA	NA	< 1
S2205	0.124 B	NA	< 0.02	NA	NA	NA	ND
S2206	0.052 B	NA	0.13	NA	NA	NA	< 1
S2207	0.081 B	NA	0.12	NA	NA	NA	ND
S2208	0.101 B	NA	0.065	NA	NA	NA	ND
S2209	0.056 B	NA	0.12	NA	NA	NA	< 1
S2210	0.039 B	NA	0.09	NA	NA	NA	< 1
B2201	0.055 B	NA	NA	NA	NA	NA	NA
B2202	0.102 B	0.17 J	0.15	0.64	NA	NA	NA
B2203	0.06 B	NA	NA	NA	NA	NA	NA
B2204	0.142 B	0.38 U	< 0.02	< 0.10	NA	NA	NA

NA: NOT ANALYZED.
ND: NOT DETECTED
B: DETECTED IN METHOD BLANK.
J: DETECTED BELOW METHOD DETECTION LIMIT.
U: NOT DETECTED.

LEGEND

MW-2 ◕ MONITORING WELL LOCATION AND IDENTIFICATION

S2201 ● SOIL SAMPLE LOCATION AND IDENTIFICATION

⊡ MONUMENT LOCATION

LOT BOUNDARY LINE

50' 0 50'

Title:

LOT 22
SUMMARY OF SOIL ANALYTICAL RESULTS

MARCUS HOOK, PENNSYLVANIA

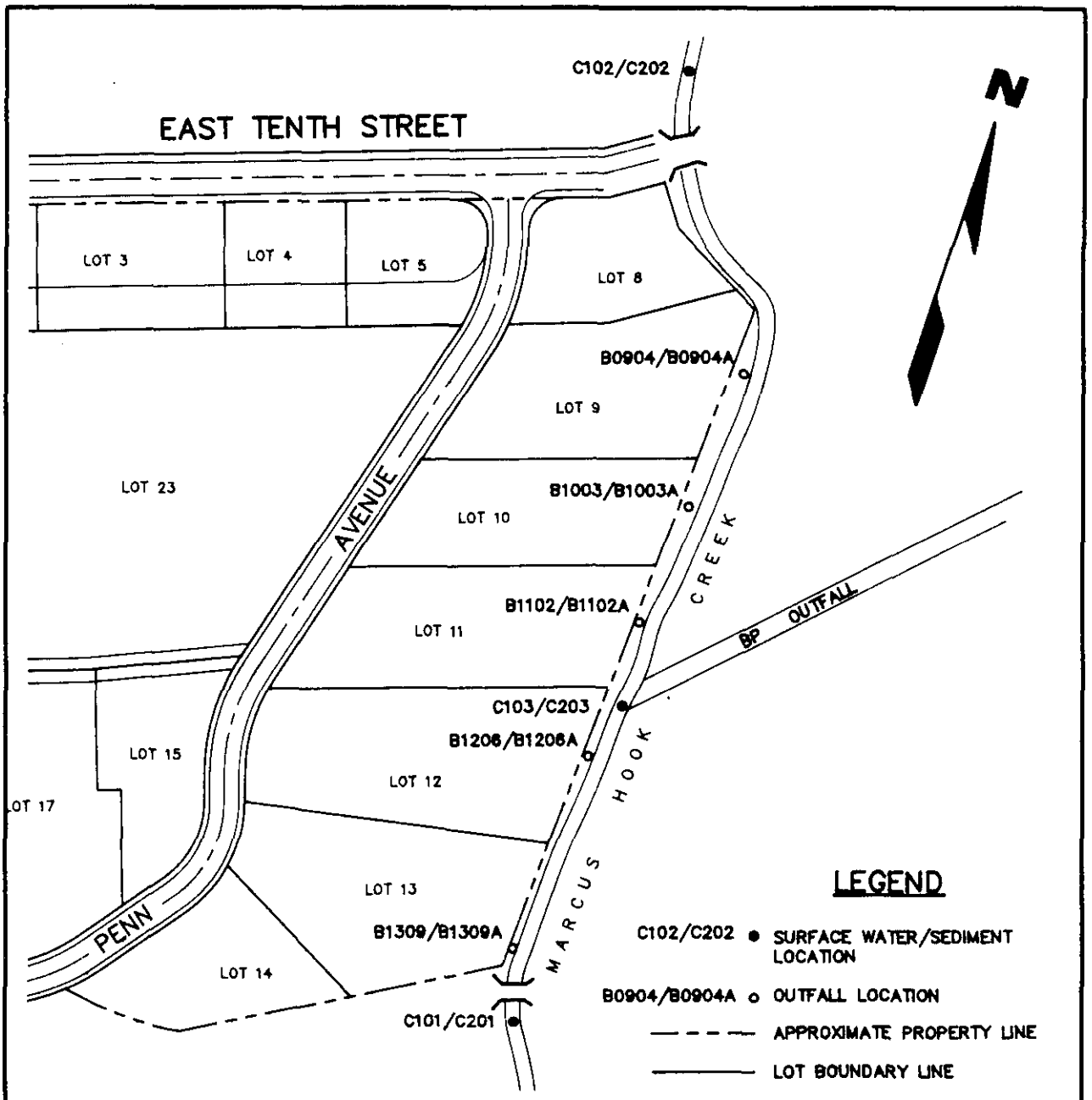
Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure
Prepared by: M.J.V.	Scale: SHOWN	34
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B39		

ORIGINAL
(Red)



NOTES:

1. C102/C202 ARE THE UPSTREAM SURFACE WATER/ SEDIMENT LOCATIONS.
2. C103/C203 ARE THE CONFLUENCE SURFACE WATER/ SEDIMENT LOCATIONS.
3. C101/C201 ARE THE DOWNSTREAM SURFACE WATER/ SEDIMENT LOCATIONS.
4. B0904/B0904A & B1003/B1003A SAMPLES WERE NOT COLLECTED AS FURTHER INVESTIGATION REVEALED THAT NO OUTFALLS EXISTED AT THESE LOCATIONS.
5. B1206A & B1309A SAMPLES WERE NOT COLLECTED SINCE THE IDENTIFIED OUTFALLS WERE INACTIVE.

200' 0 200'

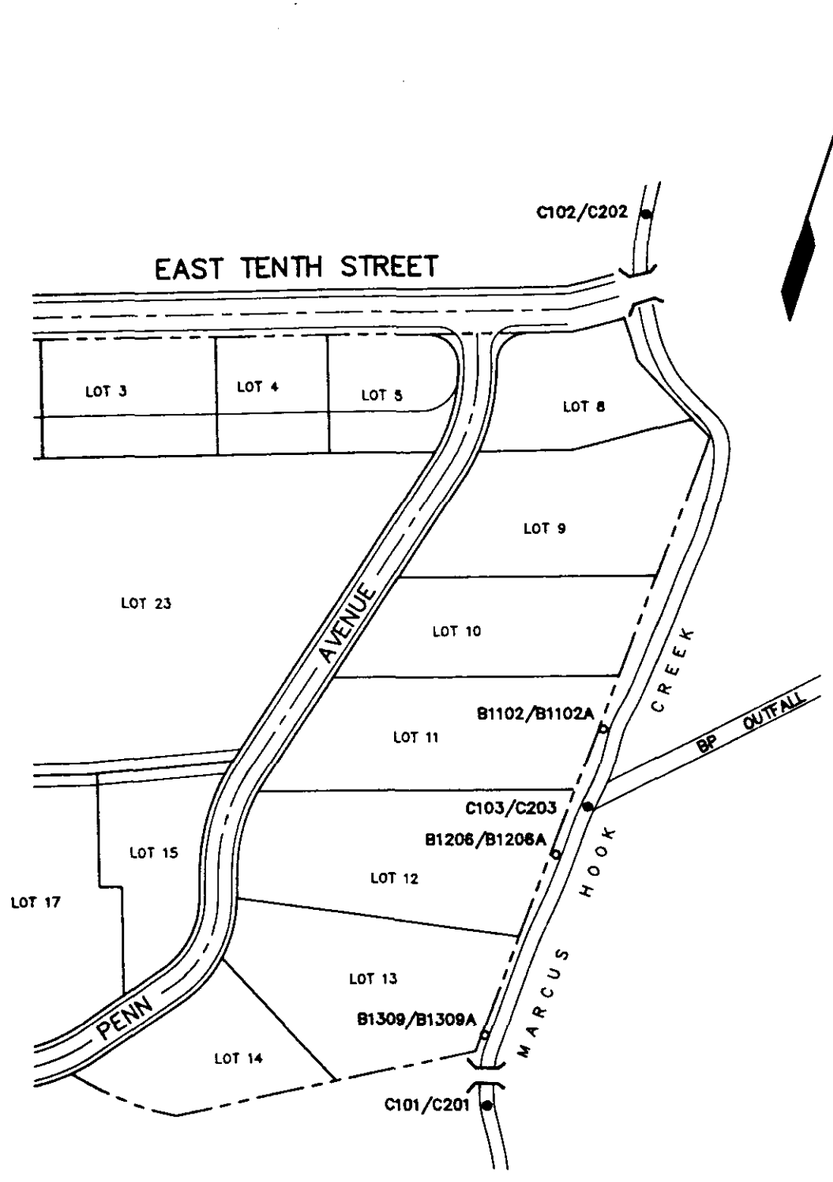
Title: SURFACE WATER/SEDIMENT/ OUTFALL SAMPLING LOCATION PLAN ALONG MARCUS HOOK CREEK
MARCUS HOOK, PENNSYLVANIA

Prepared for:
FMC CORPORATION

ROUX
ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure 35
Prepared by: M.J.V.	Scale:	
Project Mgr: G.D.M.	Revision:	
File No. 01411J--A06		

ORIGINAL (Red)



CREEK AQUEOUS ANALYTICAL RESULTS

AQUEOUS SAMPLING POINT NO.	TOTAL VOLATILES (µg/l)	TOTAL BASE-NEUTRALS (µg/l)	TOTAL PCBs (µg/l)	TOTAL PHENOLs (µg/l)	TPH (mg/l)	TOC (µg/l)	ASBESTOS (%)
C101	138 BJ	3 BJ	< 0.50	< 10	NA	NA	NA
C102	2,204 EJ	2 BJ	< 0.50	< 10	NA	NA	NA
C103	11 BJ	2 BJ	< 0.50	< 10	NA	NA	NA

CREEK SOIL ANALYTICAL RESULTS

SOIL SAMPLING POINT NO.	TOTAL VOLATILES (mg/kg)	TOTAL BASE-NEUTRALS (mg/kg)	TOTAL PCBs (mg/kg)	TOTAL PHENOLs (mg/kg)	TPH (mg/kg)	TOC (mg/kg)	ASBESTOS (%)
C201	0.184 B	0.069 J	< 0.02	< 0.10	NA	NA	NA
C202	0.032 B	96.47 EJ	< 0.02	0.30	NA	NA	NA
C203	0.141 B	0.5 U	< 0.02	< 0.10	NA	NA	NA

OUTFALL AQUEOUS ANALYTICAL RESULTS

AQUEOUS SAMPLING POINT NO.	TOTAL VOLATILES (µg/l)	TOTAL BASE-NEUTRALS (µg/l)	TOTAL PCBs (µg/l)	TOTAL PHENOLs (µg/l)	TPH (mg/l)	TOC (µg/l)	ASBESTOS (%)
B1102A	95 BJ	154 BJ	1.7	< 10	NA	NA	NA
B1206A	NS	NS	NS	NS	NS	NS	NS
B1309A	NS	NS	NS	NS	NS	NS	NS

OUTFALL SOIL ANALYTICAL RESULTS

SOIL SAMPLING POINT NO.	TOTAL VOLATILES (mg/kg)	TOTAL BASE-NEUTRALS (mg/kg)	TOTAL PCBs (mg/kg)	TOTAL PHENOLs (mg/kg)	TPH (mg/kg)	TOC (mg/kg)	ASBESTOS (%)
B1102	0.096 B	44.722	54	0.56	NA	NA	NA
B1206	0.035 B	4.132	0.11	< 0.10	NA	NA	NA
B1309	0.203 BJ	50.2	0.11	< 0.10	NA	NA	NA

NA: NOT ANALYZED.
NS: NOT SAMPLED SINCE OUTFALL WAS INACTIVE.
B: DETECTED IN METHOD BLANK.
E: SAMPLE WHICH CONTAINED COMPOUNDS WHOSE CONCENTRATION EXCEEDED THE CALIBRATION RANGE OF THE GC/MS INSTRUMENT.
J: DETECTED BELOW METHOD DETECTION LIMIT.
U: NOT DETECTED.

200' 0 200'

LEGEND

C102/C202 ● SURFACE WATER/SEDIMENT SAMPLE LOCATION

B1102/B1102A o OUTFALL SAMPLE LOCATION

APPROXIMATE PROPERTY LINE

LOT BOUNDARY LINE

Title:

SUMMARY OF CREEK AND OUTFALL AQUEOUS AND SOIL ANALYTICAL RESULTS

MARCUS HOOK, PENNSYLVANIA

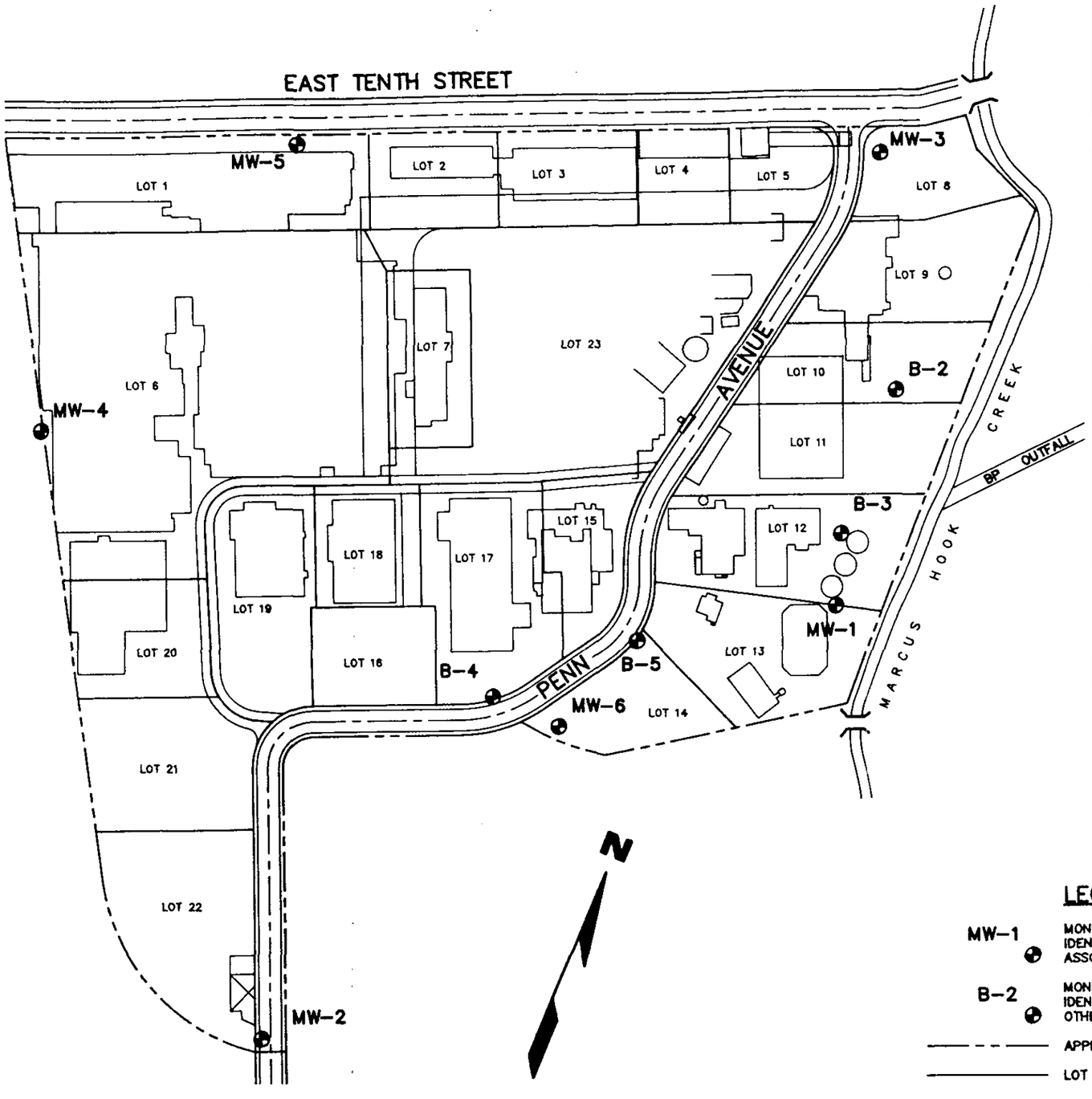
Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure
Prepared by: M.J.V.	Scale: SHOWN	36
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B44		

ORIGINAL
(Red)



AQUEOUS ANALYTICAL RESULTS

WELL NO.	TOTAL VOLATILES (µg/l)	TOTAL BASE-NEUTRALS (µg/l)	TOTAL PCBs (µg/l)	TOTAL PHENOLs (µg/l)	TPH (mg/l)	TOC (µg/l)	ASBESTOS (%)	FIELD pH (SU)
MW-1	10 BJ	1 BJ	< 0.50	< 10	NA	NA	NA	7.42
MW-2	2 BJ	2 BJ	< 0.50	< 10	NA	NA	NA	7.15
MW-2 *	1 J	NA	NA	NA	NA	NA	NA	NA
MW-3	9 BJ	5 BJ	< 0.50	< 10	NA	NA	NA	8.60
MW-4	10 U	2 BJ	< 0.50	< 10	NA	NA	NA	7.37
MW-5	18	73 B	< 0.50	< 10	NA	NA	NA	7.67
MW-5 *	2 BJ	NA	NA	NA	NA	NA	NA	NA
MW-6	36 BJ	86 BJX	28	< 10	NA	NA	NA	7.92
B-2	24 BJ	1 BJ	< 0.50	< 10	NA	NA	NA	7.86
B-3	1 BJ	1 BJ	< 0.50	< 10	NA	NA	NA	7.77
B-4	53 BJ	3 BJ	< 0.50	< 10	NA	NA	NA	7.21
B-5	2 BJ	181 BEJ	0.62	< 10	NA	NA	NA	7.43

SOIL ANALYTICAL RESULTS

SOIL SAMPLING POINT NO.	TOTAL VOLATILES (mg/kg)	TOTAL BASE-NEUTRALS (mg/kg)	TOTAL PCBs (mg/kg)	TOTAL PHENOLs (mg/kg)	TPH (mg/kg)	TOC (mg/kg)	ASBESTOS (%)
MW-1/SS-1	0.083 B	1.959 BJX	1.4	0.76	NA	NA	NA
MW-1/SS-9	0.183 B	1.305 BJ	0.13	< 0.10	NA	NA	NA
MW-2/SS-2	0.051 BJ	0.262 BJ	< 0.02	4.00	NA	NA	NA
MW-2/SS-6	0.072 B	0.39 U	< 0.02	< 0.10	NA	NA	NA
MW-3/SS-1	0.256 BJ	1.076 BJ	0.238	< 0.10	NA	NA	NA
MW-3/SS-4	0.2 B	3.273 BJ	< 0.02	< 0.10	NA	NA	NA
MW-4/SS-1	0.024 B	12.736 BJX	< 0.026	< 0.10	NA	NA	NA
MW-4/SS-3	0.032 B	2.152 BJX	< 0.024	< 0.10	NA	NA	NA
MW-5/SS-1	0.067 B	0.11 BJ	< 0.02	< 0.10	NA	NA	NA
MW-5/SS-5	0.135 B	0.11 BJ	< 0.02	< 0.10	NA	NA	NA
MW-6/SS-1	0.169 BJ	10.1 BJX	0.28	< 0.10	NA	NA	NA
MW-6/SS-7	0.118 BJ	0.211 BJ	0.06	< 0.10	NA	NA	NA

NA: NOT ANALYZED.
B: DETECTED IN METHOD BLANK.
E: SAMPLE WHICH CONTAINED COMPOUNDS WHOSE CONCENTRATION EXCEEDED THE CALIBRATION RANGE OF THE GC/MS INSTRUMENT.
J: DETECTED BELOW METHOD DETECTION LIMIT.
U: NOT DETECTED.
X: SEE ANALYTICAL REPORTS FOR ADDITIONAL QA/QC FOOTNOTES.
* : CONFIRMATORY SAMPLING ROUND.

200' 0 200'

LEGEND

MW-1 ⊕ MONITORING WELL LOCATION AND IDENTIFICATION (INSTALLED BY ROUX ASSOCIATES, INC.)

B-2 ⊕ MONITORING WELL LOCATION AND IDENTIFICATION (INSTALLED BY OTHERS)

APPROXIMATE PROPERTY LINE

LOT BOUNDARY LINE

Title:

SUMMARY OF MONITORING WELL SOIL AND AQUEOUS ANALYTICAL RESULTS

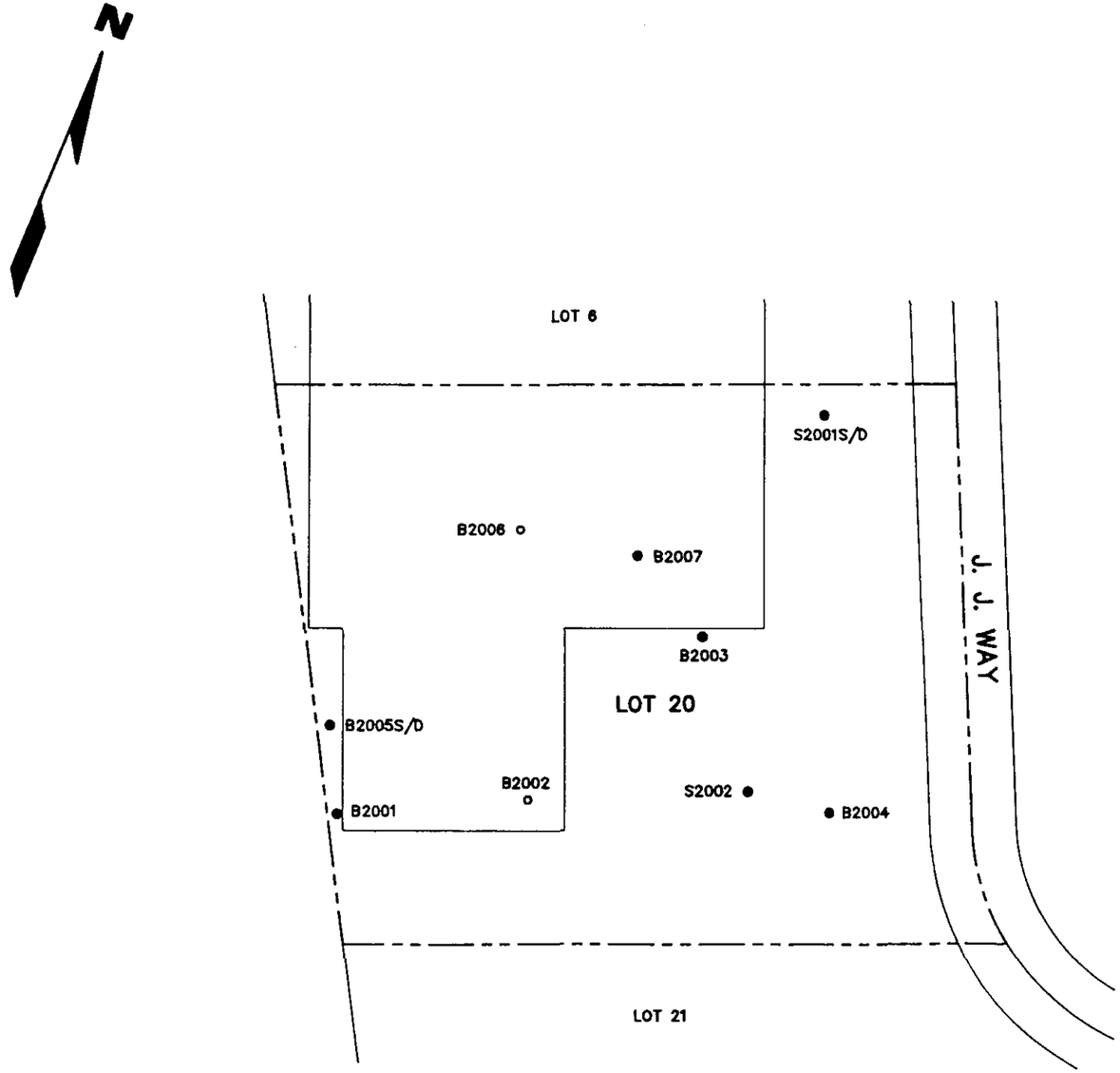
MARCUS HOOK, PENNSYLVANIA

Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure
Prepared by: M.J.V.	Scale: SHOWN	37
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B43		



ANALYTICAL RESULTS

SOIL SAMPLING POINT NO.	TOTAL VOLATILES (mg/kg)	TOTAL BASE-NEUTRALS (mg/kg)	TOTAL PCBs (mg/kg)	TOTAL PHENOLs (mg/kg)	TPH (mg/kg)	TOC (mg/kg)	ASBESTOS (%)
S2001S	0.131 BJ	NA	NA	NA	637	NA	NA
S2001D	1.323 BJ	123.3 E	430	NA	46	NA	ND
S2002	0.058 B	NA	< 0.02	NA	NA	NA	ND
B2001	0.055 B	NA	< 0.02	NA	< 25	NA	NA
B2002	NS	NS	NS	NS	NS	NS	NS
B2003	NA	NA	0.18	NA	NA	NA	NA
B2004	0.033 B	NA	0.61	NA	NA	NA	55-65
B2005S	0.039 B	NA	< 0.02	NA	1,330	NA	NA
B2005D	0.053 B	NA	< 0.02	NA	< 25	NA	NA
B2006	NS	NS	NS	NS	NS	NS	NS
B2007	0.061 B	NA	0.206	NA	54,900	NA	NA

NA: NOT ANALYZED.
NS: NOT SAMPLED
ND: NOT DETECTED
B: DETECTED IN METHOD BLANK.
J: DETECTED BELOW METHOD DETECTION LIMIT.
E: SAMPLE WHICH CONTAINED COMPOUNDS WHOSE CONCENTRATION EXCEEDED THE CALIBRATION RANGE OF THE GC/MS INSTRUMENT.

LEGEND

S2001S/D ● SOIL SAMPLE LOCATION AND IDENTIFICATION

B2002 o SOIL SAMPLE NOT COLLECTED DUE TO REFUSAL

LOT BOUNDARY LINE

50' 0 50'

Title:

LOT 20 SUMMARY OF SOIL ANALYTICAL RESULTS

MARCUS HOOK, PENNSYLVANIA

Prepared for:

FMC CORPORATION

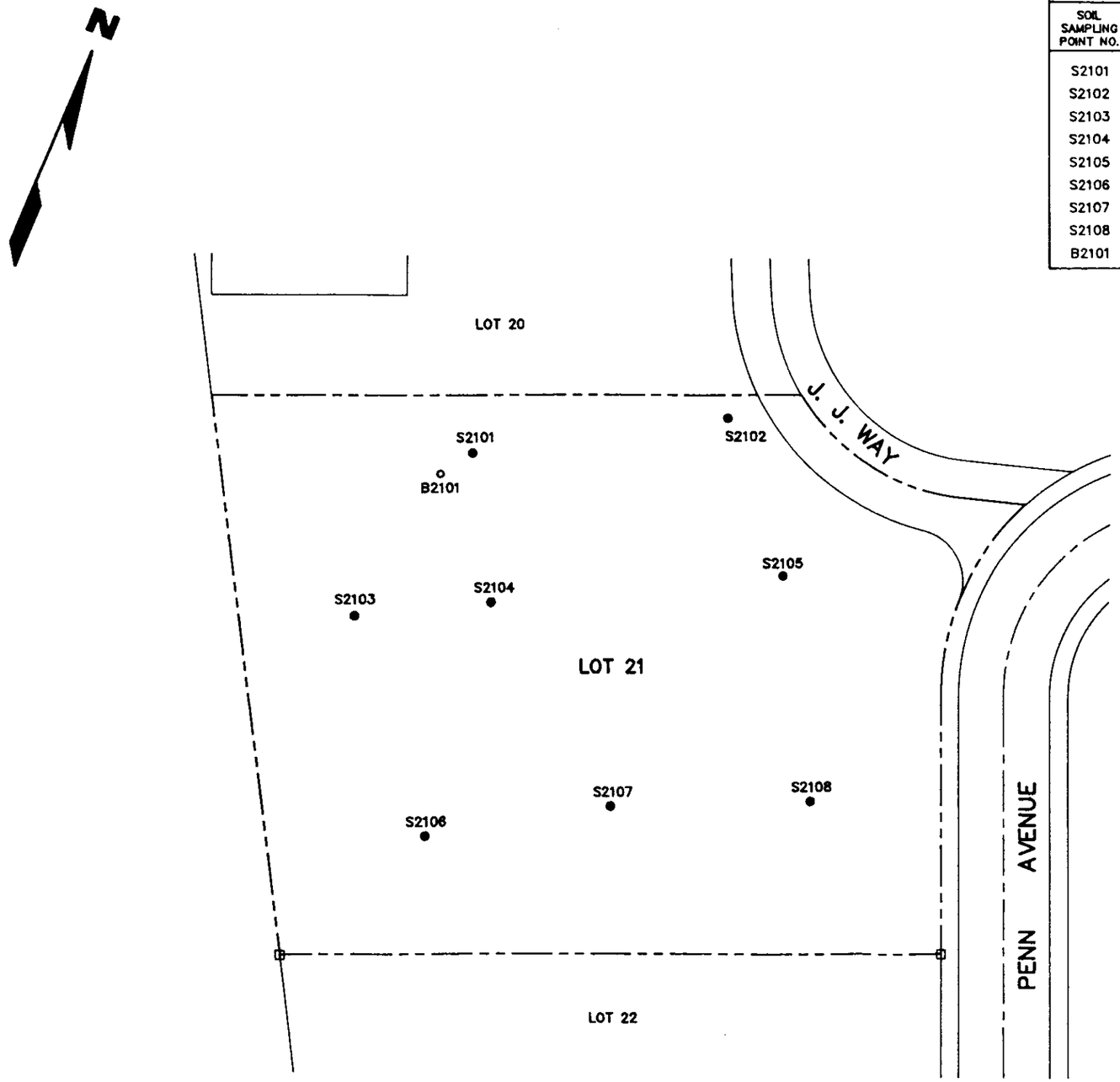
ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure
Prepared by: M.J.V.	Scale: SHOWN	32
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B37		

ORIGINAL
(Red)

ANALYTICAL RESULTS							
SOIL SAMPLING POINT NO.	TOTAL VOLATILES (mg/kg)	TOTAL BASE-NEUTRALS (mg/kg)	TOTAL PCBs (mg/kg)	TOTAL PHENOLs (mg/kg)	TPH (mg/kg)	TOC (mg/kg)	ASBESTOS (%)
S2101	0.045 B	NA	1.1	NA	NA	NA	2–4
S2102	0.087 B	NA	2.7	NA	NA	NA	1–2
S2103	0.055 B	NA	2.9	NA	NA	NA	1
S2104	0.141 B	NA	0.11	NA	NA	NA	3–5
S2105	0.176 B	NA	2.4	NA	NA	NA	3–5
S2106	0.046 B	NA	0.16	NA	NA	NA	< 1
S2107	0.048 B	NA	0.48	NA	NA	NA	ND
S2108	0.092 B	NA	0.72	NA	NA	NA	< 1
B2101	NS	NS	NS	NS	NS	NS	NS

NA: NOT ANALYZED.
NS: NOT SAMPLED
ND: NOT DETECTED
B: DETECTED IN METHOD BLANK.



LEGEND

S2101 ● SOIL SAMPLE LOCATION AND IDENTIFICATION

B2101 ○ SOIL SAMPLE NOT COLLECTED DUE TO REFUSAL

⊡ MONUMENT LOCATION

——— LOT BOUNDARY LINE

50' 0 50'

Title:

LOT 21
SUMMARY OF SOIL ANALYTICAL RESULTS

MARCUS HOOK, PENNSYLVANIA

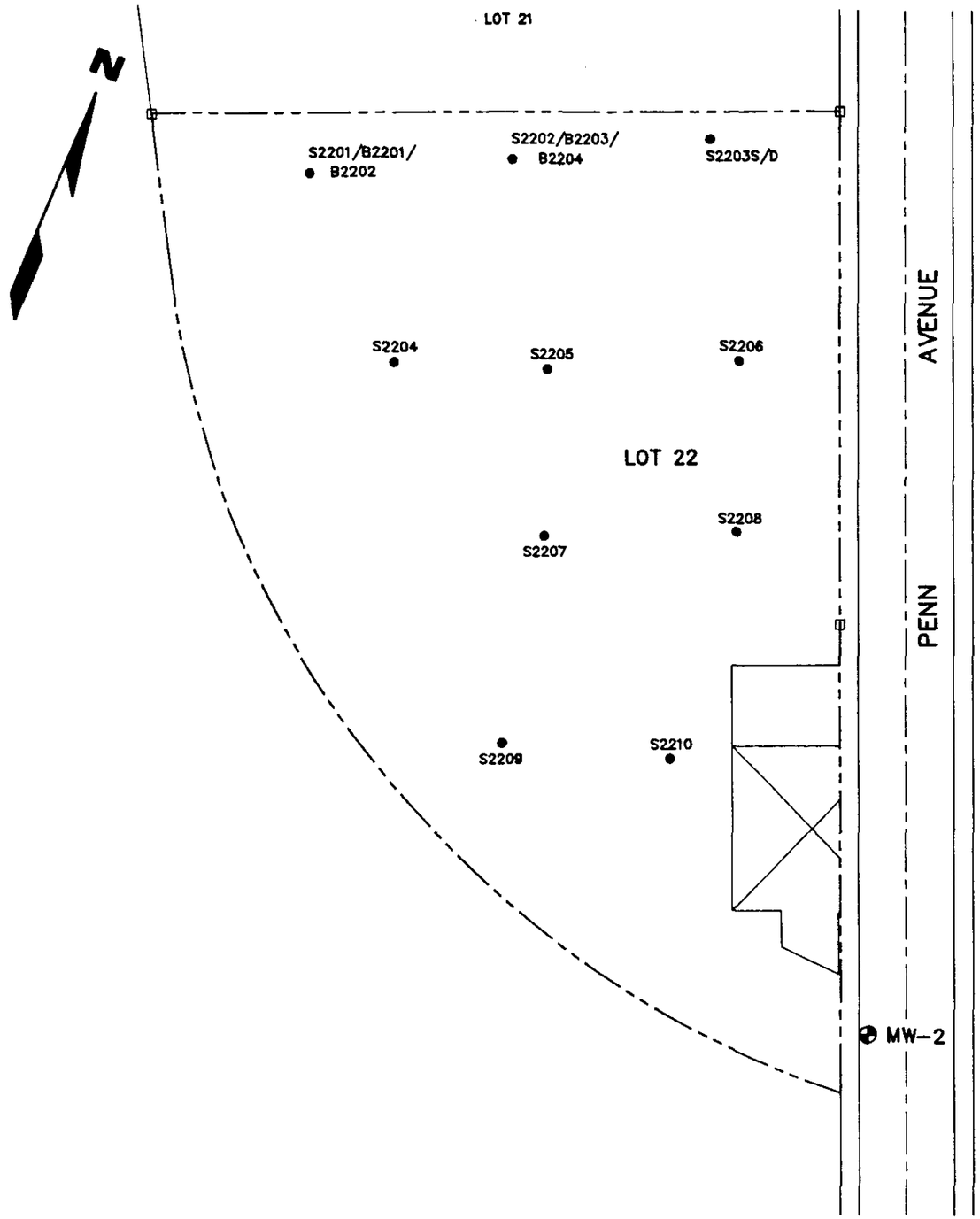
Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure
Prepared by: M.J.V.	Scale: SHOWN	33
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B38		

ORIGINAL
(Red)



ANALYTICAL RESULTS							
SOIL SAMPLING POINT NO.	TOTAL VOLATILES (mg/kg)	TOTAL BASE-NEUTRALS (mg/kg)	TOTAL PCBs (mg/kg)	TOTAL PHENOLs (mg/kg)	TPH (mg/kg)	TOC (mg/kg)	ASBESTOS (%)
S2201	0.049 B	NA	1.6	NA	NA	NA	1-2
S2202	0.077 B	NA	0.23	NA	NA	NA	< 1
S2203S	0.045 B	NA	0.17	NA	NA	NA	< 1
S2203D	0.088 B	NA	NA	NA	NA	NA	NA
S2204	0.107 B	NA	< 0.02	NA	NA	NA	< 1
S2205	0.124 B	NA	< 0.02	NA	NA	NA	ND
S2206	0.052 B	NA	0.13	NA	NA	NA	< 1
S2207	0.081 B	NA	0.12	NA	NA	NA	ND
S2208	0.101 B	NA	0.065	NA	NA	NA	ND
S2209	0.056 B	NA	0.12	NA	NA	NA	< 1
S2210	0.039 B	NA	0.09	NA	NA	NA	< 1
B2201	0.055 B	NA	NA	NA	NA	NA	NA
B2202	0.102 B	0.17 J	0.15	0.64	NA	NA	NA
B2203	0.06 B	NA	NA	NA	NA	NA	NA
B2204	0.142 B	0.38 U	< 0.02	< 0.10	NA	NA	NA

NA: NOT ANALYZED.
ND: NOT DETECTED
B: DETECTED IN METHOD BLANK.
J: DETECTED BELOW METHOD DETECTION LIMIT.
U: NOT DETECTED.

LEGEND

- MW-2 ◕ MONITORING WELL LOCATION AND IDENTIFICATION
- S2201 ● SOIL SAMPLE LOCATION AND IDENTIFICATION
- ⊡ MONUMENT LOCATION
- LOT BOUNDARY LINE

50' 0 50'

Title:

LOT 22
SUMMARY OF SOIL ANALYTICAL RESULTS

MARCUS HOOK, PENNSYLVANIA

Prepared for:

FMC CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: P.J.P.	Date: 11/92	Figure
Prepared by: M.J.V.	Scale: SHOWN	34
Project Mgr: G.D.M.	Revision:	
File No. 01411J-B39		

PLATES

EPA REGION III
SUPERFUND DOCUMENT MANAGEMENT SYSTEM

DOC ID # 401106
PAGE # _____

IMAGERY COVER SHEET
UNSCANNABLE ITEM

Contact the CERCLA Records Center to view this document.

SITE NAME East Tenth St

OPERABLE UNIT 00

SECTION/BOX/FOLDER 7d 5 7.023 (8A)

REPORT OR DOCUMENT TITLE Site Assessment report - Vol. 1 OF VI.

DATE OF DOCUMENT 11-13-92

DESCRIPTION OF IMAGERY Site Plan Showing, Subsurface utilities.

NUMBER AND TYPE OF IMAGERY ITEM(S) 1 oversized Map